A DICTIONARY OF NATURAL HISTORY

CONTAINING
UPWARDS
OF TWO
THOUSAND
COMPLETE
AND
DISTINCT
ARTICLES

A COMPENDIOUS CYCLOPÆDIA
OF THE ANIMAL KINGDOM

ALBATROSS.

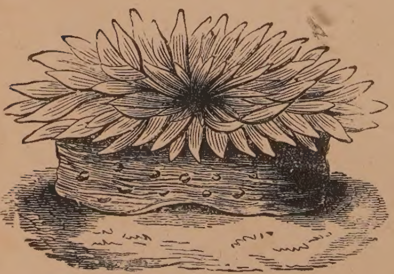
ANGLER FISH.

ANOLIUS.

ANCHOVY.

ANT.
(Magnified, with end of Claw more highly magnified).

SEA ANEMONE (MESEMBRYANTHEMUM).



SEA ANEMONE (CRASSICORNIS).

BEETON'S

DICTIONARY

OF

NATURAL HISTORY.

A Comprehensive Cyclopædia of the
Animal Kingdom.

CONTAINING UPWARDS OF TWO THOUSAND COMPLETE AND DISTINCT ARTICLES.

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PREFACE.

NATURE, throughout the extent and variety of her productions and processes, is Man's great Teacher. If, indeed, the proper study of Mankind is Man, then a mass of plainly written, and carefully illustrated, information upon the Animal Kingdom is entitled to rank high amongst the Aids to Knowledge; and we believe that the present work will materially assist readers and students in following their examination of Comparative and Human Physiology, as well as give the necessary answers to every-day questions in Natural History. There is ample testimony by the greatest minds to the vast value of an intimate acquaintance with the structure and habits of birds, beasts, and fishes; for, from the time of Aristotle, first of scientific thinkers, to this day of Darwin and Huxley, the Animal Kingdom has had for its chief ministers and expounders the very foremost intellects.

Apart from the study of Animated Nature being peculiarly a healthy and ennobling pursuit, it leads not unfrequently to practical results of a very utilitarian character. That nothing exists for nothing, we well know; it is our ignorance alone that prevents our making tenfold the use we do of the treasures, organic and inorganic, committed to our charge. It is not difficult to prove that Nature's Explorers have been the World's great Inventors; and it is certain that nothing tends more towards the effectual training of the intellectual powers, than the habit of closely examining the Natural Living Wonders which surround us on every side.

Zoology enters by far too little into the ordinary curriculum, and, alike among Statesmen and Philosophers, there are many who have properly called for more extended studies throughout the Empire of Natural History; and, than this subject, we have warrant for belief, there exists none more interesting to the minds of the youthful or mature. Now that National Education has come rightly to be considered a bounden duty amongst civilized communities, there exists an opportunity to press the claims of Natural History to be taught in all schools. It should invariably find its place among the rudiments of instruction now to be given to the coming generations, fortunate in being born in times when people have awakened to the demands of conscience and duty, preached and promulgated by earnest and sincere thinkers.

Our book will be of some assistance, we hope, both to those who prosecute their inquiries as students, and to those who shall but desire to solve some special doubt, or search for some specific information. Like all the other volumes which have been issued under the general title of Beeton's Dictionaries, it has been conscientiously compiled. The originator of this series of Compendious Cyclopædias has been aided by a number of honest workers, who have very diligently sought to carry out, faithfully and fully, the first idea of these works, which was that they should be thoroughly good books, serviceable and useful to the community at large.

S. O. B.

THE

DICTIONARY OF NATURAL HISTORY.

A.

Aard-Vark, *ard'-fark*, (Du. earth-pig,) in Zool., an animal which belongs to the class Mammalia, the order Edentata, and the family Dasypidæ. It feeds upon insects, such as ants and termites, and burrows in the ground. It is nocturnal in its habits, and during the daytime is very seldom seen in the open air. Aard-Vark is the name given by the Dutch at the Cape of Good Hope to the *Orycteropus capensis*, a species now disunited from the *Myrmecophaga*, or ant-eaters of Linnæus, with which it was formerly classed, because it has a few molar teeth, but neither incisors nor canines. In many of its habits it resembles the echidna of Australia, the myrmecophaga of America, and the pangolins of Asia; fulfilling the same purposes in Southern Africa which these species fulfil in their respective countries. The average length of an adult aard-vark is five feet.

Aard-Wolf, *ard'-woolf*, (Du. earth-wolf,) a genus of digitigrade carnivorous mammals founded by Isidore Geoffroy St Hilaire, thought by some zoologists to be a link which connects the civets with the dogs and hyænas. It is an extremely singular animal, having externally the appearance and bone-structure of the hyæna united to the head and feet of the fox, with the intestines of the civet. It was brought from Africa to Europe some years ago by the traveller Delalande. Its size is about that of a full-grown fox, which it resembles in both its habits and its manners, being nocturnal, and constructing a subterraneous abode. Its scientific name is *Proteles cristata*.

Abdomen, *ăb-do'-men*, (Lat. *abdo*, I hide,) in Anat., the belly, or lower part of the trunk, separated from the chest or upper part by the diaphragm. It contains the stomach, intestines, liver, spleen, pancreas, kidneys, &c., and is lined within by a membrane called the peritoneum. For convenience of description, the abdomen is divided horizontally into three regions,—the upper, or epigastric; the middle, or umbilical; and the lower, or hypogastric. It may also be divided longitudinally by two lines, when the above terms are confined to the central portion, the epigastric having on each side the right and left hypochondriac, the umbilical, the right and left lumbar, and the hypogastric the right and left iliac. Abdomen, in Ent., signifies the whole lower portion of the body of an insect, united to the corselet, or thorax, by a stalk of variable diameter.

Abdominales, or **Abdominal Fishes**, *ăb-dom-i-nai'-lees*, the fourth class of animals in the Linnæan system. *Charac.* Ventral fins (those of the belly) placed behind the pectoral, (those of the breast,) in the abdomen, and the branchiæ or gills ossiculated. The arrangement of Linnæus is now, however, generally discarded, the term Abdominales denoting a family or subdivision of malacopterygious or soft-finned fishes only.

Abductor Muscles, *ăb-duk'-tor*, a term given in Anat. to those muscles which pull one part of the body from another; as *adductor* muscles are those which draw one part of the body to another.

Aberdevine, *ab-er'-de-veen*, a song-bird, sometimes called the Siskin. It is the *Carduelis spinus* of Cuvier, and resembles the green variety of the canary-bird, with which it is often paired, to produce what are called mule birds. In its habits it is migratory, breeding in the north of Europe, and visiting Germany, France, and Britain only in the autumn and winter.

Abnormal, *ăb-nor'-măl*, (Lat. *ab*, from, and *norma*, a rule,) in Zool., a term applied to any structure which is opposed to the ordinary form.

Aboma, *ă-bo'-ma*, a species of large serpent, inhabiting the morasses of South America. (*See* Boa.)

Abou-Hannes, *a-boo'-han'-nes*, an African bird, considered by some naturalists to be identical with the ancient ibis. Although solitary in its habits, it is sometimes seen in small bands of from six to ten, and is capable of a lofty and powerful flight. It has some resemblance to the curlew found in Britain, but has not been observed to run. In Egypt it is called by the inhabitants *Abou-Menzel*, which literally signifies "Father Sickle-Bill," from the curved resemblance which the beak bears to that implement. The Ethiopic name, however, is *Abou-Hannes*, which means "Father John," and which, according to M. Dumont, is suppositiously applied to it because it arrives in Ethiopia about the day of St John. The ibis, although so much associated with Egypt, does not breed in that country, but arrives as the waters of the Nile begin to rise, and disappears when these subside.

ABRAMIS, *ā'-bram-is,* a sub-genus of malacopterygious or soft-finned abdominales, of which the bream is a species.

ABRANCHIA, *ă-brăn'-ke-a,* (Gr. *a,* without, and *branchia,* gills,) an order of annelida, so called because they breathe without the aid of gills.

ABRAXAS, a genus of nocturnal lepidoptera, in which is included the common magpie-moth. Its colour is yellowish white spotted with black, and a band of pale orange marks the wings. It deposits its eggs on the leaves of the currant and gooseberry in July or August, and the caterpillars are hatched in September. Its chrysalis is blackish-brown with a tinge of red.

ABSORBENTS, *ăb-sorb'-ents,* (Lat. *absorbeo,* I suck up,) a name given in Anat. to certain small delicate vessels which imbibe fluids that come in contact with them, and carry them into the blood. They are denominated *lacteals* or *lymphatics,* according to the liquids which they convey.

ABSORPTION, in Physiol., a term employed to designate that natural function of the body which is exercised by the absorbent vessels; as the absorption of the chyle by the lacteal vessels.

ACALEPHÆ, *ă-ka-le'-fe,* (Gr. *akalephee,* a nettle,) a class of marine invertebrate animals, comprehended in the sub-kingdom *Radiata,* and otherwise called *sea-nettles.* It embraces an extensive number of animals, of which the genus *Medusa* of Linnæus may be taken as the type. This genus has a nervous system and senses; a muscular system; a reproductive system and development; the power of stinging when touched; and is often phosphorescent. Acalephæ have been separated into four families,—the *Pulmonograda,* the *Ciliograda,* the *Cirrhigrada,* and the *Physograda.* These families exhibit a great variety of genera of peculiar structure and form. Some of them are extremely beautiful, and present an interesting study to the naturalist. (*See* JELLY-FISH and MEDUSA.)

ACANTHIAS, *ă-kăn'-thi-as,* a genus of sharks. The word signifies "Thorny," and is employed because in front of each dorsal fin the fish has a sharp spine. The picked dog-fish is a familiar British example.

ACANTHION, *ă-kăn'-the-on,* in Zool., a genus of Rodentia known, at present, only by their osteology. The genus was established by M. F. Cuvier.

ACANTHODERMA, *ă-kăn-tho-der'-ma,* a fossil genus of fishes.

ACANTHODES, *ă-kăn-tho'-dees,* a genus of fossil ganoid fishes, found in carboniferous strata near Edinburgh, Scotland.

ACANTHOPHIS, *ă-kăn'-tho-fis,* in Zool., a genus of venomous serpents allied to the vipers. From these, however, they are distinguished by having the head flat and projecting over the eyes; the nostrils between two shields, and a hooked spine at the end of the tail. The death adder of Australia belongs to this genus. They are viviparous, and conceal themselves among the roots of trees, depending for their prey on the effects of the poison with which their fangs are imbued.

ACANTHOPTERYGII, *ă-kăn-tho-pte-ry'-ge-i,* one of the three natural orders or primary divisions of fishes, divided by Cuvier into fifteen natural families.

ACANTHURUS, *ă-kăn'-thu-rus,* in Nat. Hist., a genus of fishes of the order Thoracici. *Charac.* Teeth small, in most species lobated; tail with a sharp spine. One species is called the Sea Surgeon, because the spines on each side cut like a surgeon's lancet. It is a native of the Indian and Arabian seas, in the latter of which it is generally seen in large shoals of two or three hundred each, swimming with great strength, and feeding principally on different kinds of sea-weed. The genus contains a large number of species, many of which are extremely beautiful both in form and colour.

ACANTHYLIS, *ăk-an-thi'-lis,* a genus of the Hirundinaceæ or Swallows. The needle-tailed swallow of Australia belongs to this genus.

ACARUS, *ăk'-ă-rus,* a genus of arachnida belonging to the order Acarina, and the family Acaridæ, and popularly called Mites. The harvest bug, the scarlet mite, the flour mite, the beetle mite, and many others, belong to the same family. The ticks are closely related to the acari. They are all of small dimensions, and many of the species are extremely beautiful when seen under the microscope, particularly by reflected light. The dog-tick, the sheep-tick, and others, are best seen by polarised light.

ACCENTOR, *ăk-sent'-or,* a genus of birds belonging to the tribe Dentirostres. The third and fifth quills of wing are longest. The hedge sparrow belongs to this genus.

ACCIPITRES, *ăk-sip'-e-trees,* (Lat. *accipiter,* a hawk,) an order of birds having a crooked beak and powerful talons. In this order are classed the vultures, falcons, hawks, and owls.

ACEPHALOUS, ACEPHALA, *a-kef'-a-lus,* (Gr. *akephalos,* headless,) in Zool., a group of molluscous animals which have no apparent head.

ACERANS, ACERA, *ă-ser'-rans,* (Gr. *a,* without, and *keras,* a horn,) in Ent., a family of apterous insects.

ACERINA, *ă-ser-i'-na,* a genus of acanthopterygian fishes distinguished by the want of teeth and the palatine bones. The common pope or ruff belongs to this genus.

ACETABULUM, *ă-se-tab'-u-lum,* (Lat. a small cup or dish,) signifies, in Zool., the suckers of the arms of the cuttle-fish, as well as other dibranchiate cephalopods, which have on this account been termed Acetabulifera.

ACETABULUM, in Anat., is the term applied to that deep cup-like cavity of the os innominatum which receives the head of the femur, or thigh-bone, thus forming the hip-joint.

ACETABULUM, in Ent., is a term signifying the cavity in the trunk in which the leg is fitted.

ACHATINA, *ă-kăt-i'-na,* in Zool., a genus of terrestrial gastropods, popularly called Agate Shells. The African achatinæ are the largest of all land snails, being eight inches long, and laying eggs as large and as hard-shelled as those of the sparrow. The genus is easily recognised by the hooks at the end of the antennæ.

ACHERONTIA, *ă-ke-ron'-te-ă,* a genus of lepidopterous insects, family Sphingidæ, which embraces some of the largest European lepidoptera, the most remarkable of which is the *Acherontia atropos,* or death's-head hawk-moth, (*which see.*)

ACHILLES TENDON, *ă-kil'-lees ten'-don,* (Lat. *tendo Achillis,*) in Anat, a tendon which connects the soleus and gastrocnemius muscles of the calf of the leg with the bone of the heel. It takes its name from the fable of the mother of Achilles dipping him in the river Styx to render him invulnerable. During this operation she held him by the heel, which thus escaped the water, and in this vulnerable spot he subsequently received his death-wound from an arrow.

ACHILLEUM, *ă-kil'-le-um*, a genus of fossil spongiadæ, of which there are two species found in the cretaceous strata of England.

ACIDASPIS, *ăs-id-ăs'-pis*, a genus of fossil crustacea, of the group *Trilobites*, found in the Wenlock limestone.

ACIPENSER, *ă-se-pen'-ser*, (Lat. *acipenser*, a sturgeon,) in Ichth., a genus of fishes of the order of *Amphibia nantes*. It has a single linear nostril; the mouth is in the under part of the head, and without teeth; the cirri are below the snout, and before the mouth. There are three species of this genus. 1. *Acipenser Huso*, the largest, is a native of Russia. The skin is so strong as to be used for traces in drawing vehicles. The isinglass of the shops is made from its sounds and scales.—2. *Acipenser Ruthenus* is also a native of Russia.—3. *Acipenser Sturio*, or the sturgeon, is frequent in our rivers. Isinglass is also made of the sounds of this fish. The sturgeon is sometimes found of the length of 18 feet, and weighing 700 lbs. It is oviparous, and spawns in water. (*See* STURIONIDÆ.)

ACONTIAS, *ă-kon'-ti-as*, a genus of lizards without external limbs. It is quite harmless, and is not unlike the blind-worm of England, feeding in much the same manner. It is popularly called the Javelin Snake, and is beautifully coloured with chestnut brown, dotted with light yellow. It is a native of Southern Africa.

ACOUSTIC DUCT, *ă-kow'-stik*, in Anat., a term applied to the meatus auditorius externus, or external passage of the ear.

ACRIDA, *ă-krid'-a*, a genus of orthopterous insects belonging to the family Locustidæ. The great green grasshopper of England belongs to this genus.

ACROBATES, *ăk-rob'-at-ees*, a genus of marsupial animals. The opossum mouse of Australia belongs to this genus.

ACROCHORDUS, *ăk-ro-kor'-dus*, a genus of serpents discovered in Java. *Charac.* Head flat, and with the body covered with small scales; without poison-fangs, but possessing a double row of sharp-pointed teeth; throat capable of great extension; tongue thick and short; length from 8 to 10 feet. The Javanese call it *Oular Carron*. It has a habit of puffing itself out to such an extent that the scales separate from each other.

ACROSALENIA, *ă-kros-a-le'-ne-a*, a genus of fossil echinodermata, occurring in the Isle of Sheppey.

ACROTEMNUS, *ă-kro-tem'-nus*, a genus of fossil ganoid fishes. One species is found in the chalk of Sussex.

ACTINIA, *ăk-tin'-i-a*, in Zool., a genus of zoophytes belonging to the order Actinoida. There are many British species, which are commonly known as *sea-anemones*, from their resemblance to flowers. They are found on all rocky coasts, and they form the chief attraction of the marine aquarium. The body is conical or cylindrical, adhering to the rock by a broad disc-like base. The mouth, which is a simple opening into the internal cavity that serves as a stomach, is surrounded by numerous tentacles, which are often beautifully marked. These organs are retractile, and, when not covered by water, the actinia appears as a smooth hemispherical lump of elastic matter, sometimes of a brilliant colour. A very great number of species belong to this order, some of which reside between high and low water mark, and others at so great a depth that they can only be casually obtained by the deep-sea line.

ACTINOCRINITES, *ăk-tin-o-krin-i'-tees*, a genus of crinoidea, comprehending a great many species. It is found in carboniferous and silurian strata.

ADA, *a'-da*, a genus of lizards belonging to the family of Teguexins, and inhabiting Guiana. One species is between four and five feet long.

ADAPIS, *ă'-dap-is*, in Zool., the name of a genus of fossil pachydermatous (thick-skinned) mammals, first described by M. Cuvier, who deduced its existence and anatomical conformation from three fragments of the head, which had been discovered in the gypsum-quarries of Montmartre.

ADDA, *ăd'-da*, the Arabic name for a small species of lizard found in Arabia, Egypt, and Nubia, wherever the smallest degree of moisture exists.

ADDAX, *ad'-dax*, a genus of antelope found in North Africa, and known by the long and spinally-twisted horns. They live in pairs, and prefer sandy to fertile country.

ADDER, *ăd'-der*, the common viper. (*See* VIPER.)

ADDUCTOR MUSCLES, *ăd-duk'-tor*, (Lat. *adduco*, I draw towards,) in Anat., are those muscles which draw the parts to which they are attached together. They are opposed to the abductor muscles. (*See* ABDUCTOR MUSCLES.)

ADIPOSE TISSUE, *ăd'-i-pose*, (Lat. *adeps*, soft fat,) in Physiol., comprises an aggregation of minute cells filled with fat, which they appropriate from the blood. This tissue serves several important purposes in the animal body; filling up interstices, forming a pad or cushion for the support of the movable parts, and assisting in the retention of heat.

ADJUTANT, in Orn., a gigantic crane, belonging to the Ardeidæ or Heron family. Its scientific name is *Leptoptilos argala*. *Charac.* The adjutant stands five feet high; the neck and head are almost bare; the beak very large, long, and of extraordinary strength. Beneath the beak hangs a downy pouch like a dewlap, which the bird has the power of inflating. The upper part of the adjutant is of an ash-gray colour, the under part white. Its voracity is wonderful: it can swallow a fowl, a rabbit, or a leg of mutton, at a mouthful; and it is extremely useful in devouring all sorts of carrion. In Calcutta it is called the scavenger, and any person wantonly killing one is fined 50 rupees. In their wild state these birds live in companies. Seen near a river, and from some distance, Dr Latham remarks that they may "well be taken for canoes upon the surface of a smooth sea, or for men and women picking up shellfish or other things on the beach." *Hab.* The warmer parts of India.

ADMIRAL, in Conch., a beautiful shell of the Volute species, and comprising four kinds: the Grand-admiral, the Vice-admiral, the Orange-admiral, and the Extra-admiral. The first is of a fine white enamel, with bands of yellow finely turned about the head, and the clavicle excited. It is principally characterised by a denticulated line along the centre of the large yellow band: this distinguishes it from the Vice-admiral. The Orange-admiral has more yellow; and the bands of the Extra-admiral run into each other.

Admiral or Admirable, in Entom., a name given to two beautiful butterflies belonging to the genus Vanessa. The Scarlet-admiral has scarlet belts upon the wings, and the White-admiral white belts.

Æga, *e'-gah*, a genus of parasitic crustacea belonging to the family Cymothoadæ, and the order Isopoda. They are popularly called Fish-lice, and resemble the common woodlouse of our gardens.

Ægle, *ē'-gle*, a genus of crustacea belonging to the family of the Crabs. It is found off the Mauritius and the Philippines.

Ægocerus, *ē-gos'-ser-us*, a genus of antelopes inhabiting Southern Africa. The Blau-bok belongs to this genus.

Ægotheles, *e-go'-thĕ-lēs*, a genus of birds belonging to Fissirostres. The owlet nightjar of New Holland belongs to this genus. It is sometimes called the New Holland Goat-sucker.

Æolidæ, *ē-o'-lid-ee*, a family of the nudibranch molluscs, known by the gills along the sides of the back. They inhabit all warm and temperate seas.

Æquorea, *e'-quor-e-a*, a genus of naked-eyed medusæ or jelly-fishes. It is known by the number of circulating vessels, which exceed eight, the slender tentacles, and the wide, many-lobed footstalk.

Ætobates, *e-tob'-at-ees*, a genus of fossil fishes allied to the Rays, the species of which are found at Sheppey, in the London clay.

Agama, or Gold-breasted Trumpeter, *a-ga'-ma*, or *Psophia crepitans*. A bird about the size of a pheasant or large fowl, with long neck and legs, but a short tail. It is found in numerous flocks in South America; can run swiftly, and, when pursued, trusts less to its wings than to its legs. In its domesticated state, the agama is so fond, faithful, and jealous, that it will attack the dogs and other animals who venture near its master to share his caresses. It belongs to the family of the Cranes.

Agamidæ, *a-ga'-mid-ee*, a family of saurian reptiles. *Charac.* Short, broad, flat heads, and thick depressed bodies, enveloped in a loose skin, which is capable of being distended with air at the will of the animal. Different species of Agamidæ are found in Asia, Africa, Australia, and America. Some species can change the colours of their skin, which causes the natives of South America to call them chameleons. They are of diminutive size, and generally lurk among rocks, heaps of stones, and mouldering ruins. Some of the more active kinds, however, climb trees, play among the branches, and feed upon insects and other small animals. The strange Moloch lizard, whose body is wholly covered with spikes, belongs to this family. It is a native of Australia. The flying dragons also belong to the Agamidæ. The frilled agama, a native of Australia, is a very extraordinary looking animal. Around its neck, and covering its shoulders, it carries a frill, which on the approach of danger is elevated.

Agate-Shell. (*See* Achatina.)

Age, *aij*, (Fr. *âge*), in Physiol.—During the progress of life from infancy to manhood, and from manhood to old age, the body undergoes certain marked changes, which distinguish the different periods or stages of life. These are usually denominated ages, and are properly seven in number, though some make them fewer. They are—1. Infancy; 2. childhood; 3. boyhood or girlhood; 4. adolescence; 5. manhood or womanhood; 6. age; 7. old age. The first age commences at birth, and extends to the end of the second year, by which time the first dentition is generally completed; the second extends to the end of the seventh or eighth year, when the second dentition is commonly over; the third extends to the age of puberty, which varies in different countries, but with us is from twelve to fourteen in the female, and from fourteen to sixteen in the male; the fourth extends to about the twentieth year in the female, and the twenty-fourth in the male; the fifth period extends in the female to about the forty-fifth or fiftieth year, when the power of procreation usually ceases, and in the male to about the forty-ninth or fiftieth year; the sixth period extends to the sixty-third year, when the seventh and last period of life commences.

Age of Animals.—It has been stated that the duration of an animal's life is generally seven or eight times longer than the period it takes to arrive at its full growth, a rule that applies moderately well to domestic animals, such as dogs, horses, sheep, oxen, and even elephants and camels, but is not applicable to man, or to the majority of quadrupeds, fishes, birds, or reptiles. The age of the horse may be calculated by an examination of the incisive teeth or nippers; but at ten years old these marks are lost, and no accurate calculation can be arrived at. Deer shed their horns every year, and, in the males of some species, each year adds a branch to the horns, until a certain size is attained. In sheep, oxen, antelopes, and goats, a ring is annually added to the base of the horn up to a certain age. There are no certain indications by which the duration of the life of birds, fishes, and reptiles can be ascertained. The Indians assert that the elephant lives 300 years Dogs live from 12 to 14 years, sheep 8 or 9, oxen about 20, horses, if well treated, from 25 to 30, camels from 40 to 50. Eagles have lived more than a century, and many instances are recorded of ravens having exceeded that period. Swans, also, have been known to live 100 years, parrots 60 and 80; pheasants and domestic poultry seldom reach more than 12 or 15 years. Among fish, the carp has been known to live 200 years. River trout have been confined in a well for 30 and 50 years. A pike has been known to exist in a pond for 90 years. A story is related of one caught in a lake near Hailerun, in Suabia, which had attained the age of 267 years. Of reptiles, the tortoise is said to be the longest lived; but this may be doubtful, as nothing is known of the duration of life of the various tribes of serpents. Of the ages of insects but little is known. The life of the caterpillar or grub, in its first period, extends to several months; but after the attainment of their perfect form, they live but a few days or weeks. As a general law of nature, early maturity indicates shortness of life.

AGELENIDÆ, *ăg-ĕl-een'-id-ee*, a family of eight-eyed spiders, including the house spider, many field spiders, and the formidable marmignatto of Corsica, which catches locusts and eats them. Its colour is deep black, with several round spots on the abdomen. One spot is deep red.

AGONUS, *ag'-o-nus*, a genus of acanthopterygian fishes belonging to the family Triglidæ or Gurnards. The lyrie, sometimes called the armed bull-head pogge, sea poacher, or noble, is an example of this genus. The body is covered with bony plates.

AGOUARA, *ag'-wâh-rah*, native name for the crab-eating racoon. (*See* RACOON.)

AGOUTI, *ă-goo'-te*, in Zool., the *Chloromys* of F. Cuvier, the *Dasyprocta* of Illiger, a genus of animals belonging to the class Mammalia, order Rodentia, and family Hystricidæ. *Charac.* Toes armed with long and very strong claws, and completely separate from each other; hind legs very much longer than the fore; head large, forehead and face convex; eyes full and black; ears short, round, and almost entirely denuded of hair; hair for the most part coarse and bristly, but in some species nearly as fine as the fur of the rabbit; twenty teeth. At the first settling of the West India islands they were very numerous, and were an article of constant consumption by the Indians; but the planters finding them too destructive to the sugar-canes, of the roots of which they are extremely fond, have destroyed them in great numbers. Whilst eating, these animals sit upon their hind quarters, and hold their food between their fore-paws. They are exceedingly voracious, and, when they have satisfied their appetite, will hide the remainder of their food for another meal. They live under decayed trees and fallen timber, are very prolific, and produce young more than once a year. Their flesh is good eating, and they hold in S. America the same place as the hare or rabbit in Europe. There are seven perfectly ascertained species; viz., the common agouti, (*Dasyprocta Aguti*,) known also by the name of the long-nosed, or yellow-rumped cavy; the black or crested agouti, (*Dasyprocta cristata*,) sometimes termed the black-crested agouti; the acouchy, or olive agouti, (*Dasyprocta Acuchi*;) the white-toothed agouti, (*Dasyprocta croconata*;) the *Dasyprocta prymnolopha*; the sooty agouti, (*Dasyprocta fuliginosa*;) Azara's agouti. *Hab.* The hotter parts of S. America, the West India islands, and Guiana.

AGRIOPUS, *ag-ri'-ŏ-pus*, a genus of fishes belonging to the Triglidæ. It is remarkable for the great development of the dorsal fin, the spinous portion rising in a curve over the shoulder and reaching nearly to the tail. The seepard of the Cape is an example of this genus.

AI. (*See* BRADYPUS.)

AIGLET, *ai'-glet*, in Zool., a young eagle. (*See* EAGLE.)

AILANTHUS, *ai-lan'-thus*. (*See* ATTACUS.)

ALAUDA, *a-law'-da*, (Lat. *alauda*, a lark,) in Orn., the lark, a genus of birds belonging to the conirostral tribe of the order Passeres, and family Fringillidæ. *Charac.* Beak cylindrical; nostrils concealed; head crested; tail forked; wings long; first quill sometimes spurious; the first, second, and third quills longest, and nearly equal; the rest considerably graduated. Various species of larks are found in all quarters of the globe. The skylark or laverock (*Alauda arvensis*) is the best known in this country. He is unrivalled as a songster, and has been a theme for poets from the earliest ages. The male alone is gifted with melody; the female makes her nest among the herbage or corn, and devotes herself almost constantly to the process of incubation. They are granivorous birds, of migratory habits, and, instead of washing, shake dust among their feathers. They are considered a great delicacy for the table. The season for catching larks commences, in this country, in the middle of September, and terminates at the end of February. More than 4000 dozens are annually supplied to the London markets alone. The *Alauda arvensis*, or skylark, and the *Alauda arborea*, or woodlark, are the only ones that sing when flying. The skylark rises perpendicularly, the woodlark in widely-extended circles; and they sometimes soar to an enormous height, and sing for an hour together. The shorelark (*Alauda alpestris*) is frequently found in North America, and generally breeds near the sea-shore. The calandra lark (*Melanocorypha calandra*) is a larger bird than the skylark, and possesses a more sonorous voice. In Italy, a good singer is compared to a calandra. Among other species, there are the *pratensis*, or titlark, which frequents meadows; the *arborea*, or woodlark, distinguished by a white fillet about the head. It is less than the skylark; the colours are paler, and the voice less varied, but sweet. The *campestris* has half of the chief feathers of the wings brown, except two, which are white, and the throat and breast yellowish. The *trivialis*, whose tail is partly brown and partly white, is a native of Sweden. The *cristata* is a native of Europe, and sings like the skylark. The *spinoletta* is a native of Italy. The *magna* is common in Africa and America. The New Zealand lark inhabits Charlotte Sound, where it is named *Kogoo Aroure*.

ALBACORE, *al'-bă-kore*, a fish belonging to the family Scomberidæ. (*See* TUNNY.)

ALBATROSS, *ăl'-ba-tross*, (*Diomedea*,) a genus of web-footed birds, of which there are three species,—the common albatross, (*D. exulans*;) the albatross of China, or sooty albatross, (*D. fuliginosa*;) and the yellow-beaked albatross, (*D. chlororynchus*.) *Charac.* A long, hard beak, curved at the extremity, the upper mandible composed of several articulated pieces, the lower mandible smooth and short; the nostrils lateral, and placed like small rolls in the furrow of the mandible; feet short, with the three toes long and completely webbed; wings long and narrow. The common albatross, which is often met with in the seas of Southern Africa, is the largest sea-bird known; its weight varying from 12 to 28 lbs. A specimen in the Leverian Museum measured 13 feet between the extremity of the extended wings. One remarkably large bird, shot off the Cape of Good Hope, measured from wing to wing 17½ feet. The top of the head is a ruddy gray, the rest of the plumage, with the exception of several transverse black bands on the back, and a few of the wing-feathers, is white; the bill is of a pale yellow, and the feet and membrane of a deep flesh colour. Towards the end of June these birds hover in immense flocks about Behring's Straits and Kamtschatka, attracted thither by the shoals of fish, whose migrations the albatross perseveringly follows. So great is their voracity, that they will swallow a salmon of 5 lbs. weight; they do not, however, limit their diet to fish, but will prey on any sea animal; and Captain Cook's sailors caught them with a line and hook. They never attack other sea-birds, but are often attacked by gulls, who are vastly their inferiors in strength: their flesh is dry and tough. The Kamtschatkadales use their entrails as buoys for nets, and their wing-bones as tobacco-pipes. (*See* DIOMEDEA.)

ALCA, *al'-ka.* (*See* AUK.)

ALCEDO, or **KINGFISHHR**, *ăl-se'-dō*, a family of birds belonging to the fissirostral tribe of the order Passeres. *Charac.* Bill long, thick, pointed, and quadrangular; tongue short, and slightly arrow-shaped at the point; nostrils at the side of the base of the bill; legs short; three toes, the outer joined to the middle one as far as the second joint; wings with the first and second quills nearly equal. Only one species of kingfisher is indigenous to Britain, though there are sixty other species described by naturalists. This bird was known to the ancients by the name of the Halcyon. They supposed that its nest was built upon the surface of the sea, and that during incubation it had the power of calming the troubled deep; the days on which they were presumed to exercise this power were called Halcyon days. The Ostiacs and Tartars preserve the skin of the alcedo about their persons in a purse, as a charm against every evil. The feathers they use as love-amulets; and they believe that a woman touched by a feather which has floated on the water, will fall in love with the man who uses it. The most remarkable among the species are:—1. *Alcedo galbula*, or green jacamar, about the size of a lark; bill square and black, and sharp at the point; plumage a bright green, glossed with copper and gold. This species is found in Guiana and Brazil, and feeds on insects.—2. *Alcedo ispida*, or common kingfisher, about the size of a swallow; bill long, and the shape inelegant; top of the head and the coverts of the wings of a dark green, spotted with light blue; back and tail of a bright azure; the under side of the body orange. It feeds on fish.—3. *Alcedo paradisea*, or paradise jacamar, of the same size as the preceding; throat, front of the neck, and under wing-coverts white, the rest of the body a dull green, slightly shaded with black, violet, and copper. It is a native of Surinam.—4. *Alcedo rudis*, or Egyptian kingfisher, about the size of the Royston crow; bill black; head, shoulders, and back brown; throat and belly dusky white; tail ash-coloured; the legs of a pale green, and the claws black. It is a native of Egypt, and feeds on frogs, insects, and small fish.—5. *Alcedo cayenensis*, about the size of a starling; back of a blue colour, the under parts white, and the legs red. It is a native of Cayenne and Guiana.—6. *Alcedo torquata*, or cinereous kingfisher, about the size of a magpie; colours, a bluish ash, chestnut, white, black, and yellow. It is a native of the West Indies.

ALCES, *ăl'-sees*, the Elk. (*See* DEER.)

ALCYONELLA, *ăl-sy-o-nel'-la*, a genus of polyzoa belonging to the order Phylactolæmata. The polyzoary is tubular, and the tubes are united.

ALCYONIDIADÆ, *al-sy-on-id-i'-ă-dœ*, a family of polyzoa, known by the spongy polyzoary, and the contractile orifices of the cells. They belong to the order Infundibulata.

ALIMA, *al'-i-ma*, a genus of stomapod crustacea, remarkable for the great length of the body and the large and loose cuirass. It inhabits the warmer seas.

ALIMENTARY CANAL, or **DUCT**, *ăl-i-men'-ta-re*, (Lat. *alimentum*, nourishment, food,) is the name given to that great canal or conduit in animal bodies through which the food passes from the mouth to the anus. In the human subject, it comprises the pharynx, œsophagus or gullet, stomach, and large and small intestines, being, in a full-grown individual, nearly forty feet in length.

ALIMENTS, *ăl'-i-ments*, (Lat. *alimentum*, from *alo*, I nourish,) a term applied to those substances which, upon being taken into the stomach, are capable of affording nourishment to the body. Every aliment must be derived from either the animal or vegetable kingdom, as the capacity of affording nourishment to the animal system would appear to belong exclusively to organised matter, or that which has possessed life. Nevertheless, certain substances appertaining to the inorganic kingdom, although incapable of themselves to form an aliment, have yet the power, when taken in conjunction with aliments, of assisting in the process of nutrition. These inorganic substances are principally water, salt, lime, &c. Aliments have been distinguished into nine classes. The first, or *Farinaceous* class, includes barley, wheat, oats, rice, maize, potatoes, haricots, lentils, peas, &c. The second, or *Mucilaginous* class, comprehends melons, cabbages, turnips, beet-root, carrots, asparagus, &c. The third, or *Sweet* class of aliments, includes dates, apricots, dried grapes, figs, the various sorts of sugars, &c. In the fourth, or *Acidulous* class, there are grapes, strawberries, raspberries, mulberries, pears, prunes, apples, cherries, oranges, gooseberries, &c. In the fifth, or *Fatty* class, there are animal fats, oils, butter, cocoa-nuts, walnuts, olives, sweet almonds, &c. The sixth, or *Caseous* class, includes the various sorts of milk, cheese, &c. In the seventh, or *Gelatinous* class, there are several kinds of fish, the flesh of young animals, calf's-foot, &c. In the eighth, or *Albuminous* class, there are included brain, eggs, &c. The ninth, or *Fibrinous* class, comprehends the flesh and the blood of various animals. To these nine divisions a tenth may be added, comprehending the *Condiments*, as pepper, salt, mustard, vinegar, horseradish, &c. Certain liquids, or *Drinks*, should also be reckoned among the aliments, as water of various kinds, (spring-water, well-water, river-water,) the infusions of tea and coffee; the various kinds of fermented liquors, as cider, perry, beer, wine, &c.; the alcoholic liquors, as gin, whisky, brandy, &c. As a rule, aliments require to be prepared by cooking, so as to be made more agreeable to the palate, or more easy of digestion, but few aliments being used in an undressed or natural condition.—*Ref.* Hooper's *Lexicon Medicum;* Mrs Beeton's *Book of Household Management.*

ALLIGATOR, *ăl-li-ga'-tor*, a genus of emydosaurian reptiles, distinguished from the crocodiles by the canine teeth of the lower jaw, which fit into a hollow in the edge of the upper jaw. The alligators are found in the New World.

There are three groups of alligators, namely, the true alligators, the jacares, and the caymans. The first group has the hind feet deeply webbed, and the two latter have their feet very slightly webbed, but are distinguished by the eyelids, which in the jacares are fleshy, and in the caymans are furnished with three bony plates. (*See* CROCODILE.)

ALOPONOTUS, *ăl-o-pon-o'-tus*, a genus of lizards belonging to the Iguanidæ, and distinguished by the very minute scales of the back and the smooth throat pouch. It is a native of St Domingo. (*See* IGUANA.)

ALPACA, *ăl-păk'-a*, in Zool., a species of the genus Lama, with which it is so closely allied, that by some it is set down as being only a variety. The alpaca inhabits the mountainous parts of Peru, and obtains its aliment from the coarse and scanty herbage growing on the sterile soil of those elevated regions. Its general form bears a close resemblance to that of the sheep, but its head and neck are more graceful. The upper part and sides of this animal's body are covered with light chestnut-brown wool, which hangs down in slightly curled meshes almost a foot in length. This wool is extremely soft and elastic, and is nearly as fine as that of the Cashmere goat. The face, up to the posterior margin of the jaws, has short smooth hair; but, from the forehead, a stiff silky hair falls over the eyes. The shearing of the wool takes place annually, from 10 to 12 lbs. of wool being obtained from a single animal.

ALPACA WOOL, *ăl-păk'-a*.—This wool is obtained from the alpaca, or paco, an animal allied to the sheep and goat, inhabiting the mountains of Peru. Great efforts have been made to naturalise it in this country, in Germany, and in Australia. In the latter country, the experiment has been attended with some success. The wool of the alpaca is long, lustrous, and silky. Its manufacture into textile fabrics was begun in 1843, at Bradford, in Yorkshire, and has since progressed at such a rate, that Mr Titus Salt, of that town, has built one of the largest and most splendid factories in the world, which in itself constitutes a town called Saltaire, a compound of the name of its founder and that of the river upon which it stands.

ALPHÆUS, *ăl-fee'-us*, a genus of macrouran crustacea allied to the shrimp. The beak is very small, and the carapace projects over the eyes like a hood.

ALUCITA, *ă-lu'-sit-a*, a genus of moths, in which both pairs of wings are divided into six lobes. The twenty-plumed moth is a familiar example.

AMBERGRIS, *ăm'-ber-gris*, (Fr. *ambre*, amber, *gris*, gray.)—Ambergris is a morbid secretion of the sperm whale, much used in perfumery, found floating on the sea, or deposited on the coast. Although possessed of little scent, it imparts a delicate odour to other perfumes.

AMBYSTOMA, *ăm-bys'-tŏm-a*, a genus of *Batrachia gradientia*, found in North America. There are no claws on the toes. The pretty spotted Eft of America is a good example of this genus. The general colour of this creature is violet black, with a row of oval or circular spots of bright yellow along each side.

AMBLYOPSIS, *ăm-bly-op'-sis*, a genus of malacopterygian fishes belonging to the family Heteropygidæ. The amblyopsis is found in the Mammoth Cave of Kentucky, and is quite blind, without the least external trace of eyes. The length of the fish is about three inches, and in general aspect it much resembles the common loach of our rivers. The scales are very minute, and cannot be seen until the skin is dry.

AMEIVA, *ăm-i'-va*, a genus of lizards belonging to the Teguexins, and having a very long whip-like tail. This tail is covered with a series of scaly rings, about one hundred and twenty in number. The toes of the hind feet are very long. Its colour is dark olive, with rows of black-edged white spots on the sides. It inhabits Central America.

AMER. (*See* GENETTA.)

AMMONITE, *ăm'-mo-nite*, in Conch., a genus of fossil shells allied to the living genus Nautilus. In shape they resemble a ram's horn,—whence their name, from their supposed likeness to the horns upon the statue of Jupiter Ammon. Having, also, very much the appearance of a coiled snake, they are vulgarly termed petrified snakes. They are found plentifully in the oolite formations, and are so abundant in some parts of Burgundy, that the roads are paved with them. The animal that inhabited this shell was provided with air-sacs, by means of which it could rise or sink in the water; and its shelly covering, necessarily delicate in order to float, was made strong enough to bear the pressure of great depths by its tubular form and internal ribs or supports.

AMMODYTES, *ăm-mŏ-di-tees*, a genus of malacopterygian fishes, belonging to the order Apodes, and the family Ophidini. The common sand-launce or wriggle is a familiar example of this genus.

AMMOTRAGUS. (*See* AOUDAD.)

AMNIOS, or AMNION, *ăm'-ni-os*, in Midwifery, is the membranous bag in which the fœtus is inclosed in the womb, and which also contains the *liquor amnii*. It is composed of three membranes; an outer, or filamentous one, called *decidua*; a middle, named the *chorion*; and an inner, called the *amnion*.

AMŒBA, *ă-me'-ba*, a genus of rhizopodous animals, remarkable for its continual change of shape. It is very minute, and can only be seen by means of a microscope.

AMPELIS, *am'-pe-lis*, a genus of Chatterers. The Bohemian or waxen chatterer belongs to this genus.

AMPHIBIA, *ăm-fib'-i-a*, in Zool., an order of the class of Reptiles. In ordinary language, the term amphibious has been applied,—to animals such as frogs, which at one period of their existence are aquatic, breathing by means of gills, and which at another period of their life respire air, and are frequently on land; to animals such as seals, which, although breathing by means of lungs, are yet capable of remaining under water for some time; to various terrestrial animals, such as the hippopotamus, which frequent an aquatic medium. But if the term amphibious be taken in its literal sense, viz., as denoting the power of living both on land or in the water indifferently, it will be found to apply to only four genera of batrachian reptiles, which, according to Cuvier, are the only known truly amphibious animals, inasmuch as they alone possess simultaneously both lungs and gills. These animals are the axolotls, the menobranchi, and the sirens, inhabiting the American rivers and lakes, and the proteus, whose habitat is the underground streams which connect some lakes in Carniola and Hungary. In the system of Linnæus the Amphibia comprehended the whole of the animals now known as reptiles, such as serpents, frogs, tortoises, and lizards; and even the cartilaginous fishes; but according to the most philosophical of the later naturalists, the term Amphibia has been restricted to that order of reptiles called Batrachians; for this reason, that these animals breathe by means of gills in their earliest or tadpole condition, and afterwards acquire lungs, and respire air on assuming their perfect form as reptiles.—*Ref.* Todd's *Cyclopædia of Anatomy and Physiology; English Cyclopædia.* "Natural History." (*See* BATRACHIANS, FROG, SIREN, SALAMANDER, PROTEUS.)

AMPHIOXUS, *am-fi-ox'-us*, a genus of leptocardial fishes, possessing a pulsating vessel instead of a heart, and a dorsal cord instead of vertebræ. The lancelet is a British example.

AMPHIPODA, *ăm-fip'-od-ah*, an order of sessile-eyed crustacea, in which the head is made of one segment, the gill vesicles are under the thorax, and the first five pairs of abdominal limbs are used for locomotion.

AMPHISBÆNIA, *ăm-fis-be'-ni-a*, an order of plated reptiles, covered with square plates imbedded in the skin, and having either the limbs wanting, or very feeble. The amphisbæna, or two-headed snake, as it is wrongly called, inhabits Brazil.

AMPHITHOE, *ăm-fith'-o-ee*, a genus of sessile-eyed crustacea belonging to the order Amphipoda, and popularly called Coast-screws. They are remarkable for building submarine nests of weeds and materials of their own secretion.

AMPULLARIA, *ăm-pul-lā'-ri-a*, a genus of holostomatous molluscs, of the family Paludinidæ. They are popularly called Apple-snails, and are found in the lakes and fresh waters of hot countries. During drought, they burrow deeply into sand, and remain underground until the rains fall.

ANABLEPS, *ăn'-a-bleps*, a genus of malacopterygian fishes, remarkable for the great size of their projecting eyes, which are separated across the midde by an opaque band, so that the fish appears to have four eyes, two looking upward and two downward. They are popularly called Star-gazers. Their habitat is Surinam.

ANACONDO, *ăn-a-con'-do*, a gigantic serpent of Tropical America. It lives near water, and preys upon fish, and on the animals that come to drink. It is without poison-fangs, and kills its victims by crushing them in the folds of its body. This enormous serpent is allied to the boa constrictor, and even exceeds that terrible reptile in dimensions. There is hardly a native animal which it cannot swallow entire, the apparently slender throat dilating and the jaw-bones separating widely apart in order to allow the passage of the prey into the stomach. Like all its kind, it twists its tail round a tree, and darts at its victim with open mouth, which is full of curved teeth, like so many hooks. It does not feed often, one meal serving it for many weeks, so that it is not so formidable as many predaceous animals which eat a less quantity but more frequently. Its colour is warm brown, decorated with a double row of round black spots along the back, and a single row of black-edged yellow rings along each side.

ANAS. (*See* DUCK.)

ANATOMY, *a-năt'-o-me*, is a term derived from the Greek verb *anatemno*, I cut up, and properly signifies the separation of a thing into parts by cutting. All material substances either are or have been, or are not and have not been, possessed or endowed with life. The former have an organised structure, in which, in the living state, changes take place, and processes are carried on necessary to their existence. The latter are composed of homogeneous particles, and are subject only to mechanical or chemical changes. In the former are comprehended all plants and animals, in the latter all mineral or inorganic substances. It is to the former of these two great divisions that the term Anatomy is applied. It is the art of dissecting organised bodies for the purpose of ascertaining their internal structure; it is also the science which deals with the knowledge thus acquired, and deduces general principles from it. As organised bodies naturally form themselves into two distinct classes,—plants and animals; so we have Vegetable anatomy, or the anatomy of plants, and Animal anatomy, or the anatomy of animals. Animal anatomy, again, is subdivided into Comparative anatomy, which treats of the structure of all animals except man, and Human anatomy, which deals with the structure of man only. It is to this last that the general term Anatomy is usually applied. Human anatomy, or anatomy proper, then, treats of the several parts and organs of the human body, in respect to their form, structure, and relation to each other. It is usually divided into general, descriptive, and pathological. General anatomy treats of the nature and general properties of the separate substances of which the body is composed, not as these exist combined in special organs, but as they form distinct and peculiar substances. Descriptive anatomy comprehends a description of the several parts and organs of the body, with an account of their situation, connexions, and relations, as existing in the natural and healthy state. Pathological, or Morbid anatomy, traces and describes the changes produced by disease upon healthy structures, whether existing in individual organs, or in the primitive or common substances of which these organs are composed. As an account of the various parts and organs of the human body, as well as of the diseases to which they are subject, will be found under their several names, in other parts of this work, it is unnecessary to do more here than give a short summary of the subject, referring to these articles for more special information.

General Anatomy.—The human body consists of solid and fluid substances, the fluid bearing to the solid parts a general ratio of from 7 to 1 to 9 to 1. The fluids of the body are various, but may be divided into three classes:—The circulating nutritious fluid called the blood; the fluids which are incessantly poured into it for its renewal—viz., the chyle and lymph; and the fluids which are separated from it by secretion, as saliva, bile, gastric juice, &c. The blood is that well-known red fluid which, by means of the heart, arteries, and veins, circulates through all parts of the system, and supplies the waste that is constantly going on. The Chyle is a milky fluid, separated from the chyme or digested food after it has passed from the stomach into the small intestines, and become mixed with the bile and pancreatic juice. It is absorbed by the lacteals, and conveyed by ducts or canals to the receptaculum chyli, where it is taken up by the thoracic duct, and poured into the blood. The Lymph is a colourless fluid, like water, taken up by the lymphatic vessels, which pervade almost every part of the body. It seems to differ little from chyle, except that the latter contains a greater preponderance of fatty matter. The greater portion of the lymph is poured into the receptaculum chyli, where it becomes mixed with the chyle, and is carried with it into the blood; that, however, collected from the right side of the head and chest, and right upper limb, is conducted into the right subclavian vein, by the right lymphatic or right thoracic duct. The Secretions are the fluids secreted or separated from the blood. The term is sometimes used to include the excretions which are thrown off from the body as useless or noxious, as urine from the bladder, perspiration from the skin; but it is properly applied only to such products as are secreted from the blood, but still retained in the system for the performance of certain subordinate actions. These are—1. saliva, secreted by the salival glands of the mouth; 2. gastric juice, by the stomach; 3. pancreatic juice, by the pancreas; 4, bile, by the liver; 5. tears, by the lachrymal gland; 6. milk, by the mammary glands; 7. semen, by the testes; 8. oil, by the vessels of the adipose tissue; 9. synovia, by the synovial glands of the joints; and 10. mucus, by the mucous glands.

The organised solids of the human body are usually divided into the following seventeen elementary tissues:—1. Bone, or osseous tissue, which forms the framework of the body, to which the other structures are attached, or in which they are contained. 2. Muscular tissue, consisting of fine fibres, which are for the most part collected into distinct organs called muscles, by means of which the active movements of the body are performed. 3. Adipose tissue, which constitutes the fat of the body as well as the marrow of the bones. 4. Areolar, cellular, or connective tissue, a soft, filamentous substance of considerable tenacity and elasticity, which is extensively distributed over the body, and forms the connecting medium of all the other tissues. 5. Fibrous tissue, formed of a number of minute fibres, running chiefly parallel to each other, and sparingly supplied with blood-vessels or nerves, and used for connecting, enveloping, or binding together various parts of the human body, as tendons, ligaments, fasciæ, periosteum, perichondrium, dura mater. 6. Elastic, or yellow tissue, characterised by possessing a high degree of elasticity, and employed wherever that quality is required, as in forming the spinal ligamenta subflava. 7. Cartilage, an opaque substance, usually of a pearly or bluish-white colour, but sometimes yellow, covering the articular extremities of the bones, connecting the surfaces or margins of immovable bones, or lining the walls of certain cavities, also found in the ear, nose, larynx, &c. Fibro-cartilage is, as its name indicates, a structure intermediate between fibrous tissue and cartilage, partaking, in some measure, of the firmness of the one with the elasticity of the other. 8. Nervous tissue, which goes to form the nervous system. 9. Blood-vessels, comprising the arteries by which the blood is conducted from the heart to all parts of the body; the veins, by which it is brought back again to the heart; and the capillaries, minute vessels by which it is carried from the extremities of the one to those of the other. 10. Absorbent vessels and glands, comprising the lacteals and lymphatics, together with the glands in connexion with them. 11. Serous and synovial membranes, which resemble each other in general form and structure, but are distinguished by the nature of their secretions; the former lining the cavities of the body which have no outlet, as the peritoneum in the abdomen, the pleura and pericardium in the chest, and secreting a transparent and nearly colourless fluid, which moistens the surface; the latter lining the cavities of the joints, and secreting a viscid fluid which lubricates their surface. 12. Mucous membrane, which lines those internal passages of the body exposed directly or indirectly to contact with the atmosphere, and secretes a fluid of a more consistent and tenacious character than the serous membranes. 13. Secreting glands, a class of organs widely differing from each other in their nature and form, but all devoted to the function of secretion. 14. Vascular or ductless glands, so called from their general resemblance to secreting glands, but differing from them in having no duct for the conveyance of their secretions, which are reabsorbed or filtered through the tissues, or find an outlet by bursting. 15 Skin,—cutis vera, derma, or corium, the innermost of the three structures that go to make up what is commonly termed the skin, and which covers the whole body. 16. Pigment, a black or dark-coloured substance occurring in various parts of the body, and giving colour to the skin of the negro and other dark races. 17. Epithelium, a thin transparent structure covering the whole surface of the body, as well as the walls of the different cavities, and named differently, according to the parts which it covers; as epidermis, covering the skin; the epithelium of mucous membranes, &c.

Descriptive or *Special Anatomy*, is commonly divided into several branches, according as it regards the bones (*Osteology;*) the articulations; the muscles (*Myology;*) the blood-vessels and absorbents (*Angiology;*) the nervous system (*Neurology;*) the organs of sensation, respiration, digestion, &c. (*Splanchnology.*)

Osteology.—The number of bones in the human body is variable; but in the adult they are estimated at about 244. They are usually divided into long, flat, and irregular;—long, as in the thigh and leg; flat, as in the skull and pelvis; irregular, as in the hands and feet. Bones are covered with a peculiar membrane called the periosteum, which serves to conduct the blood-vessels and nerves. The osseous skeleton is divided into head, trunk, upper and lower extremities. The head comprises the bones of the cranium and those of the face, including three common to both. The bones of the cranium are eight in number,—the frontal, in the fore part of the skull; the two parietal, forming a portion of its sides and all its superior part; the occipital, forming its lower and back part; the two temporal, forming the lower part of the sides and part of the base; the sphenoid, in the middle of the base; and the ethmoid, in the middle of the fore part of the base. The bones of the face are fourteen in number,—the ossa nasi, which form the arch of the nose; the ossa lacrymalia, at the fore part of the inner edge of the ocular orbits; the malar bones, forming the prominences of the cheeks; the upper maxillary bones, forming the upper jaw, and containing the upper teeth; the ossa palati, situated at the posterior part of the palate, the nose, and the orbits; the vomer, a flat bone, forming part of the septum of the nose; the ossa turbinata inferiora; and the lower maxillary bones, forming the lower jaw, and containing the under teeth. There are thirty-two teeth,—sixteen in each jaw; viz., four incisors or front teeth, two cuspidati or canine, four bicuspidati, and six molares. The last molar on each side is called the *dens sapientiæ*, or wisdom-tooth, because it does not appear till about the age of twenty-one. The os hyoides, or hyoid bone, is placed in the anterior and upper part of the neck, and has no osseous connexion with any other bone. The trunk is divided into the spine, thorax, and pelvis. The spine is a pyramidal column, extending from the head to the pelvis, and is composed of twenty-four bones, termed vertebræ. Each vertebra consists of a body and seven processes, and has a foramen, or ring, through which the spinal cord passes. They are divided into three classes,—the cervical, including the first seven; the dorsal, consisting of twelve, which are larger than the cervical, and are distinguished by having their sides and transverse processes depressed for connexion with the ribs; and the lumbar, consisting of five, which are larger than any other. The first two cervical vertebræ differ from the others, and are known as the atlas and the axis, or vertebra dentata. There are likewise five so-called false vertebræ on account of their being separate in early life, but afterwards uniting to form the os sacrum, which constitutes the posterior part of the pelvis. The thorax, which contains the principal organs of circulation and respiration, is the largest of the three great cavities connected with the spine, and is formed by the sternum and costal cartilages in front, the twelve ribs on each side, and the dorsal vertebræ behind. The sternum is a flat narrow bone, situated in the anterior part of the thorax, and connected with the ribs by means of the costal cartilages. The ribs are twenty-four in number, twelve on each side, of which the first seven are termed vertebro-sternal, or true ribs, and are attached to the sternum; three are attached to the costal cartilages, and are called vertebro-costal; and two are termed vertebral or floating ribs, from their anterior extremities being free. The pelvis or lower cavity of the trunk, consists of four bones,—the os sacrum and os coccygis behind, and the two ossa innominata on either side. The os coccygis, which forms the terminal bone of the spine, is sometimes regarded, like the os sacrum, as composed of four false vertebræ, which are at first distinct, but afterwards become united. The ossa innominata are two irregularly-shaped bones, situated one on each side of the pelvis, and consisting of three parts, the ilium, ischium, and pubis, firmly united in the adult, but distinct in the young subject. Each of the two upper extremities is composed of the bones of the arm, the forearm, and the hand, and is united to the trunk by means of the scapula and clavicle, which form the shoulder. The scapula is a flat triangularly-shaped bone, placed upon the upper and back part of the thorax. The clavicle, or collar-bone, is a long bone, something in the form of the italic letter *f*, and situate between the top of the sternum and the acromion process of the scapula. The arm has only one bone, the os humeri, which extends from the scapula to the bones of the forearm. The forearm consists of two bones, the radius and ulna, which are parallel, and play upon each other; thus admitting of freer motion in that part. The radius, so called from its resemblance to the spoke of a wheel, is situate on the outer side of the forearm. Its upper end is small, and forms only a small part of the elbow-joint, while its lower extremity is large, and forms the chief part of the wrist-joint. The ulna is placed at the inner side of the forearm, and differs from the radius in being larger at the upper than at the lower extremity. The bones of the hand are divided into the carpus, the metacarpus, and phalanges. The bones of the carpus, or wrist, are eight small bones, arranged in two rows, the upper row comprising the scaphoid, semilunar, cuneiform, and pisiform,—the lower, the trapezium, trapezoid, os magnum, and unciform. The metacarpal bones, or bones of the palm, are five in number, and correspond to the fingers. The phalanges, or bones of the fingers, are fourteen in number, each finger, with the exception of the thumb, (which has only two,) having three of them. The upper and lower extremities bear a great resemblance to each other in the nature and form of their bones. Like the upper, each of the lower extremities consists of three distinct parts—the thigh, leg, and foot. The thigh is composed of a single bone, the os femur, which is the longest and largest in the body. The upper part forms a round head, which is inserted into a deep cup-like cavity of the os innominatum, called the acetabulum: the lower terminates in two protuberances, known as the inner and outer condyles, separated posteriorly by a deep fossa, called the inter-condyloid. The leg consists of three bones,—the patella, tibia, and fibula. The patella, or knee-pan, is a small, flat, triangular bone of a spongy texture, situated at the anterior part of the knee-joint, between the femur and the tibia. The tibia and fibula in the leg resemble the radius and ulna in the forearm; the tibia is, after the femur, the largest bone of the body; it is situate at the anterior and inner side of the leg, articulating with the femur above and the astragalus below. The fibula is considerably smaller than the tibia. Its upper extremity is small, and placed below the level of the knee-joint, but the lower extremity projects below the tibia, and forms the outer ankle. The foot, like the hand, is composed of three classes of bones,—the tarsus, the metatarsus, and the phalanges. The tarsus is composed of seven bones,—the os calcis, astragalus, cuboid, scaphoid, and three cuneiform. The metatarsal bones are long small bones, five in number, connected at the one extremity with the tarsal, at the other with the phalangeal bones: these last go to form the toes, each of which has three, except the great toe, which has only two.

Articulations.—The different bones of the skeleton are connected together in various ways, and such connexions are termed articulations. They are of various kinds, but are usually divided into immovable, movable, and mixed. Immovable articulations exist where flat and broad bones are united to enclose important organs, as in the cranium and pelvis. In some parts the edges indent or interlock each other; in others they are brought into close contact, or are united together by a thin layer of cartilage. The movable articulations are of various kinds, according to the kind of motion required. In such cases, the bony surfaces brought into contact are covered with cartilage, bound together by ligaments, and lined by synovial membrane. Mixed articulation prevails where only a slight degree of motion is required, combined with great strength, as in the vertebræ. The bones of the head and face are connected together by immovable articulation, except the lower jawbone, the condyle of which articulates with the anterior part of the glenoid cavity of the temporal bone and the anterior root of the zygoma. The movements permitted by this articulation are very extensive. The different vertebræ of the spine are connected together by ligaments and the inter-vertebral substance; the latter a fibro-cartilaginous, slightly elastic substance, interposed between the adjacent surfaces of the different vertebræ, from the axis to the sacrum, and forming the chief bond of connexion between these bones. It varies in shape, size, and thickness, in different parts of the spine. The articulations of the first and second vertebræ are different, and much more complicated than the others, in order to admit of the various movements of the head. In the articulations of the ribs to the vertebræ, the heads of the ribs are connected with the bodies of the vertebræ by one set of ligaments, and the necks and tubercles of the former with the processes of the latter by another set, admitting of a limited upward and downward motion, and a very slight motion backwards and forwards. The cartilaginous articulation of the ribs with the sternum admits only of a very slight motion upwards and downwards. In the pelvis, the articulation of the sacrum with the last of the true vertebræ, and of the coccyx with the sacrum, are similar to that of the vertebræ with each other. The lateral surfaces of the sacrum and ilium articulate with each other by means of an irregular lamella of cartilaginous structure and several sets of ligaments. The sacrum is also connected with the ischium by two ligaments, known as the great sacro-sciatic and lesser sacro-sciatic. The two pubic portions of the ossa innominata articulate in front by means of an elongated piece of cartilage interposed between the osseous surfaces, and connected with each; the union being strengthened by ligaments. In the upper extremity, the sterno-clavicular articulation is formed by the sternal end of the clavicle, the upper and lateral part of the head of the sternum, and the cartilage of the first rib. The motion here is almost in every direction—upwards, downwards, backwards, forwards, as well as circumductive. The scapula-clavicular articulation is formed between the outer extremity of the clavicle and the upper edge of the acromion process of the scapula, and the movements are gliding and rotatory. At the shoulder is what is termed a ball-and-socket joint, the large globular head of the humerus being inserted into the glenoid cavity of the scapula, and admitting extensive motion in almost every direction. The hinge-joint at the elbow is formed by the lower extremity of the humerus and the upper extremities of the radius and ulna, and allows extensive flexion and extension movements. The rotatory movements of the forearm arise from the connexions of the radius and ulna; at the upper extremity the inner side of the head of the radius rotates within the lesser sigmoid cavity of the ulna—at the lower the head of the ulna rotates upon the sigmoid cavity at the inner side of the radius; while the middle portions of the two bones are connected by two ligaments, forming what is termed the middle radio-ulnar articulation. The wrist-joint is formed by the radius and the inter-articular fibro-cartilage, which separates it from the ulna and the three first bones of the carpus, and admits of flexion, extension, abduction, adduction, and circumduction. The bones of the carpus are united by special ligaments so as to form two rows, and the rows are connected together by ligaments to form a joint. The articulations of the carpal with the metacarpal bones admit only of a slight gliding motion of the different surfaces upon each other, except in the case of the thumb, where it is much more varied. The carpal extremities of the last four metacarpal bones articulate with one another at each side, and are bound together by ligaments to form the palm of the hand. The articulations of the metacarpal bones with the phalanges, and of the phalanges with each other, form hinge-joints. In the lower extremity the head of the femur is received into the acetabulum, or cup-shaped cavity of the os innominatum, and connected by strong ligaments to form the hip-joint. The knee-joint is formed by the lower extremity of the femur articulating with the head of the tibia, and the patella, and gives flexion and extension with a slight rotatory motion. The tibia and fibula are connected together, like the radius and ulna, by various ligaments, and their upper and lower extremities brought into contact; and have a slight gliding motion upon each other. The ankle-joint is formed by the inferior extremities of the tibia and fibula, united so as to form an arch, into which the superior convex surface of the astragalus is received, and allows of flexion and extension. The articulations of the tarsal, metatarsal, and phalangeal bones, do not differ materially from those of the hand, except that their ligaments are generally stronger, and admit of less motion.

Muscles.—The muscles, with their appendages, the fasciæ and tendons, constitute the active organs of motion. They serve also to protect the walls of large cavities, and to give form and symmetry to the whole body. Muscular tissue is of two kinds, distinguished by structural peculiarities and mode of action. The one class comprises the muscles of voluntary or animal life; the other of involuntary or organic life. The muscles of animal life, or striped muscles, are those that are capable of being exerted or controlled by the will, and include not only the so-called voluntary muscles, but all the muscles of the ear, those of the larynx, pharynx, tongue, and upper half of the œsophagus, the heart, and the walls of the large veins at the point where they open into it. The muscles of organic life, or unstriped muscles, form the muscular coat of the digestive canal from the middle of the œsophagus to the internal sphincter ani, of the urinary bladder, the trachea and bronchi, the ducts of glands, the gall-bladder, arteries, &c. The muscles are named from their situation, direction, use, shape, or points of attachment; as, tibialis, obliqui capitis, adductor longus, deltoid, sterno-hyoid. In the human body there are sixty-six muscles at each side of the head and neck; ninety at each side of the trunk, and two single ones; fifty-three in each of the upper extremities; and fifty-six in each of the lower. The limits of the present article preclude our attempting to give details of the situation, relations, &c., of this numerous class of organs, which, besides, would have little interest for the general reader. (*See* MUSCLE.)

Angiology.—The blood-vessels of the human body are the heart, arteries, veins, and capillaries. The heart is a conical muscular organ, lying obliquely beneath and behind the sternum, with its tip pointing downwards, forwards, and towards the left. It is divided by a longitudinal septum into a right and left half, the former containing venous, the latter arterial blood; and each half is subdivided transversely into two portions communicating with each other, the upper being termed the auricle, the lower the ventricle. From the right ventricle, the blood is sent, by means of the pulmonary arteries, to the lungs, whence it is returned by the pulmonary veins into the left auricle, passed into the left ventricle, and thence conveyed by the aorta to every part of the body. The aorta, commencing at the left ventricle, ascends for a short distance, then arches over the root of the left lung, descends along the vertebral column within the thorax, passes through the diaphragm into the abdomen, and divides, opposite the fourth lumbar vertebra, into the right and left common iliac arteries. These last subsequently divide into two branches, named the internal and external iliac arteries; the former being distributed to the walls and viscera of the pelvis, the latter proceeding to the lower limbs, after sending two important branches to the walls of the abdomen. The branches sent off from the arch of the aorta are five in number,—the two coronary arteries which supply the heart; the innominate artery, dividing afterwards into the right carotid and subclavian arteries; the left carotid, and the left subclavian. Each of the carotids afterwards separates into the external and internal carotid; the former being distributed to the external parts of the head and face, the latter to the internal parts of the cranium. The subclavian artery supplies the upper extremity, giving off, as branches, the vertebral, the internal mammary, thyroid axis, and the superior intercostal arteries. From the thoracic portion of the aorta numerous branches are given off, chiefly of small size, and known as the pericardiac, bronchial, œsophageal, posterior mediastinal, and intercostal arteries. The abdominal aorta gives off numerous branches, which may be divided into two sets,—those which supply the viscera, and those which are distributed to the walls of the abdomen; the former comprising the cœliac artery, (which shortly divides into the gastric, hepatic, and splenic arteries,) the superior mesenteric, the inferior mesenteric, the capsular, the renal, and the spermatic arteries; the latter, the phrenic, lumbar, and middle sacral arteries. The veins which return the blood from the capillaries to the heart are of two kinds,—the pulmonary, conveying arterial blood from the lungs to the left auricle of the heart, and the systemic, carrying venous blood from all parts of the system back to the right auricle of the heart. The pulmonary veins are four in number, two for each lung, and differ from other veins in being destitute of valves. The systemic veins are usually arranged into three groups, according to their mode of termination in the heart:—1. Those of the head, neck, thorax, and upper extremities, which terminate in the superior vena cava; 2. those of the abdomen, pelvis, and lower extremities, which terminate in the inferior vena cava; and 3. the cardiac veins, returning the blood from the substance of the heart, and opening directly into the right auricle. The veins, in their general form and distribution, correspond to the arteries. The vena cava superior is a short trunk formed by the junction of the two venæ innominatæ, and terminating in the upper parts of the right auricle. The vena cava inferior is formed by the junction of the two common iliac veins between the fourth and fifth lumbar vertebræ, and terminates in the lower and back part of the right auricle. The capillaries (from *capillus*, a hair) are minute vessels pervading every part of the body, and uniting the extreme points of the arteries with those of the veins. Their diameter varies in different parts, but is usually about 1-3000th part of an inch. We have already said something about the absorbent system, and must refer, for further particulars, to the heads LACTEALS and LYMPHATICS.

The *Nervous System* consists of two parts, known as the cerebro-spinal and the sympathetic or ganglionic systems. The former includes the brain and spinal cord, with the nerves proceeding from them, and is regarded as the nervous system of animal life; the latter consists of a double chain of ganglia, running along the spinal column, whose functions seem to be less directly connected with the mind, and chiefly bear upon the animal life. The cerebro-spinal system is divided into the encephalon, or portion contained within the cranium, and the spinal cord, enclosed within the vertebral canal. The encephalon comprises the cerebrum, the cerebellum, the pons Varolii, and the medulla oblongata, and is covered with three membranes, called the dura mater, (or outermost,) the arachnoid membrane, and the pia mater. The substance of the encephalon is of two kinds,—a cineritious or grayish substance, called also corticle, from forming the outer part of the cerebrum and cerebellum; and a white or medullary matter, forming the inner substance of the cerebrum and cerebellum, but the outer of the medulla oblongata and pons Varolii. The cerebrum, or brain proper, forms by far the largest portion of the encephalic mass. Its upper surface is divided into a right and left hemisphere, by a longitudinal fissure lodging the falx cerebri. The under surface of each hemisphere is marked off into three lobes, called the anterior, middle, and posterior. The entire surface of each hemisphere presents a number of convoluted eminences, separated from each other by depressions of various depths. The cerebellum, or little brain, is situate beneath the hinder part of the cerebrum, from which it is separated by the tentorium cerebelli. It is likewise divided into two lateral hemispheres; but its surface is not convoluted, but laminated. It is connected with the rest of the encephalic masses by means of connecting-bands, called crura or peduncles, two of which ascend to the cerebrum, two descend to the medulla oblongata, and two unite in front to form the pons Varolii. This last occupies a central position on the under surface of the encephalon, and constitutes the bond of union between the other parts, being connected above by crura from the cerebrum, at each side by crura from the cerebellum, and being in contact below with the medulla oblongata. This last extends from the lower border of the pons Varolii to the upper part of the spinal cord. It is pyramidal in form, with its broad extremity directed upwards, and measures about an inch and a quarter in length. By means of two fissures, it is divided into two lateral and symmetrical halves. The spinal cord is situate within the vertebral canal, and extends from the foramen magnum of the occipital bone to the first or second lumbar vertebra, where it terminates in the cauda equina, an aggregation of nervous cords occupying the remainder of the canal. The spinal cord, like the encephalon, is enclosed by the three membranes,—the dura mater, arachnoid, and pia mater. It is composed of white and gray matter; the former external, the latter internal. The gray substance is found, on making a section, to be arranged in a crescental shape in each hemisphere of the cord, the posterior corners being much longer than the anterior. From the spinal cord spring thirty-one pairs of spinal nerves, corresponding to the number of true and false vertebræ, between which they issue, except that there are eight pairs of cervical nerves and one coccygeal. Each spinal nerve arises by two roots,—an anterior, or motor, and a posterior, or sensitive. These approach one another, and, with few exceptions, unite in the corresponding inter-vertebral foramen into a single cord, which almost immediately divides into two branches, one of which proceeds to the muscles, &c., of the back, the other to the anterior parts of the body. Besides the spinal nerves, there are nine pairs of nerves that issue from the encephalon to different parts of the head and face. They are connected with the organs of seeing, hearing, taste, smell, &c.; and are hence named optic, auditory, olfactory, &c. They are also distinguished numerically, as first, second, third, &c., according to the part of the brain from which they spring. The sympathetic, or ganglionic nervous system, is composed of a series of ganglia, or nervous centres, extending along the spinal column from the base of the skull to the coccyx, connected with each other by filaments, and also communicating in various parts with the cerebro-spinal system. They are regarded as the nerves of organic life, and principally supply the various viscera and blood-vessels.

Splanchnology.—Regarding the anatomy of the various organs of sensation, respiration, digestion, &c., we must refer to the accounts given under their proper names, in other parts of this work.

History.—Some knowledge of the internal structure of the human body was doubtless obtained at a very early period. The ancient Egyptians are said to have acquired great anatomical skill from their practice of embalming, and Homer displays a considerable amount of knowledge of the human body in his description of wounds, in the "Iliad." Hippocrates, who flourished about 400 years B.C., is regarded as the first author who treated anatomy as a science. Erasistratus, and Herophilus of Alexandria, are considered as the first that dissected and described the human body, nearly 300 years B.C. Galen, however, (B. 131 A.D.,) is the author of antiquity that displays the most intimate knowledge of the human body; and even he evidently obtained a great part of his knowledge from dissections of apes and other animals, there being a law in Rome which forbade the use of dead bodies. During the dark ages, anatomy, like the other sciences, made little progress. The interest in anatomy began to revive about the 13th century, and, in the beginning of the 14th, Mundinus dissected and demonstrated the different parts of the human body, at the university of Bologna, and published a work which formed the text-book in Italy for nearly 200 years. During the next 200 years, the interest in anatomy continued to increase, and, within that period, there are several respectable names in connexion with it; as Gabriel de Zerbio, Achillini, Berenger, and Massa. The errors of Galen, however, still prevailed till the time of Vesalius, who flourished about the middle of the 16th century, and boldly, by dissections of the human body, pointed out the errors into which he had fallen. He is regarded as the father of modern anatomy. His great work, *De Corporis Humani Fabrica*, was published before he was twenty-eight years of age. He gave a great impulse to human dissection; and, among his contemporaries, or immediate successors, were Fallopius, Eustachius, Varoli, and Fabricius. In the 17th century the progress of anatomy was rapid. In 1619 Harvey's great discovery of the circulation of the blood was announced. Asellius, in 1627, gave out his discovery of the lacteals; and in 1651 Rudbeck discovered the lymphatics. Among the other distinguished anatomists of this century were Bartholin, Pecquet, Jolyffe, Wharton, Swammerdam, Willis, Malpighi, and Ruysch. In the 18th century we have many eminent names. In Italy, which still retained a first place, were Valsalva, Santorini, and Morgagni; in France, Winslow, Vicq d'Azyr, and Bichat, (the founder of general anatomy;) in Germany, Haller, Meckel, Zinn, and Soemmerring; in Holland, Boerhaave, Albinus, Camper, and Bonn; and in England, Cheselden, the two Hunters, Charles Bell, and the Munroes of Edinburgh. The present century has been specially characterised by the great advance made in minute or microscopic anatomy. Among the names of this period may be mentioned Cloquet, Magendie, Müller, Quain, Goodsir, Bowman, Todd, Sharpey, Ellis, Wilson, Quekett, Gray, and Holden.—*Ref.* Quain's *Anatomy;* Gray's *Anatomy;* Holden's *Human Osteology;* Wilson's *Anatomist's Vade-Mecum.*

Anatomy, Comparative. (*See* Zoology.)

Anchorella, *ăn-kor'-el-la*, a genus of parasitic entomostraca, so called because the shape of the adult female somewhat resembles an anchor.

Anchovy, *an-tcho'-ve*, or *an'-cho-ve*, (Fr. *anchois*,) in Ichth., a genus of abdominal malacopterygious fishes, belonging to the Clupeidæ or Herrings. (*See* Clupeidæ.) With the exception of the common anchovy, they all inhabit the tropical seas of America and India. The common anchovy is found in the Atlantic, along the shores of France and Portugal. It is sometimes taken off the coasts of Holland and England; but is abundant in the Mediterranean, where, off the island of Gorgona, to the west of Leghorn, it is very plentiful. The months of May, June, and July, are the periods when they quit the deep seas, and visit the shores of the Mediterranean, which they enter in immense shoals by the Straits of Gibraltar. The Romans compounded from them a favourite sauce, which they termed *garum*. In modern times, the anchovy is also regarded as an appetising morsel in the form of pastes, &c. *Charac.* Colour, bluish-brown on the back, and silvery white on the belly; anal fin short, and the dorsal placed immediately above the ventral. *Size*, about three inches. (For Anchovy recipes, see Mrs Beeton's *Household Management*.)

Ancilla, or **Ancillaria**, *ăn-sil-lai'-ri-a*, in Zool., a term given by Lamarck to a genus of mollusca. They are somewhat numerous, principally found in tropical climates. Some of them are furnished with a small tooth, which is placed at the end of a groove crossing the front of the shell. The most common species is the ivory-shell: this and some others are distinguished from the genus in general, by having the front of its axis deeply pierced. The shells are usually very smooth, as if polished.

Anconeus, *ăn-ko'-ne-us*, (Gr. *agkon*, the elbow,) in Anat., a small triangular muscle, situated immediately beneath and behind the elbow-joint. It is connected with the humerus above, and the ulna below, and assists in extending the forearm.

Ancylus, *ăn'-si-lus*, in Zool., a mollusc, commonly known as the fresh-water limpet. It is common in stagnant water and rivulets in Europe, America, and the West Indies, adhering to stones and plants. It is closely allied to the pond-snail, differing principally in the conical form of the body and shell. It agrees with it in having two compressed triangular tentacles, with the eyes sessile on the outer base. A cavity in the middle of the back serves for the purposes of respiration, and an aperture closed by a valve opens in the middle of the left side. These shells are occasionally mistaken for those of the Siphonariæ; but they may be readily distinguished by their being sinistral, very thin, and covered with a hairy epidemis.

Andra, *ăn'-dra*, a gazelle of Northern Africa.

Andrenidæ, a genus of bees, varying much in size and habits; they are all solitary, and are wholly burrowers, making a series of cells in sandy banks, decaying wood, straws, the pith of dead twigs, and similar situations. The members of the typical genus, Andrena, are all burrowers in the ground, and sometimes dig their little tunnels so deeply that to trace them is a difficult task. At the end of the tunnel is a slightly-enlarged chamber, in which is placed a lump of pollen mixed with honey, about as large as a pea. The egg is laid in the yellow mass, which affords subsistence to the little grub when it is hatched. Nearly seventy species of Andrena are found in England, and their tunnels may generally be found in dry and stony soils. (*See* Mr F. Smith's elaborate *Catalogue of British Hymenoptera.*

Anemones, Sea, the popular name for the plant-like animals formerly included in the genus Actinia, but now distributed in several genera. (*See* Actinia.) They are found on all shores, generally attached to the rocks which are only exposed at low tide. A great number of beautiful species are common to our English coasts, but the larger and more brilliant ones occur in tropical seas. When fully expanded, their tentacles, which are usually richly coloured and arranged in regular circles, greatly resemble the petals of some of our most symmetrical simple flowers, such as the marigold, carnation, and anemone; or, still more closely, the florets of composite flowers, such as the daisy and chrysanthemum. This resemblance suggested the names *sea-anemones* and *animal-flowers*, by which they are commonly known. Since the invention of the aquarium, (*which see*,) these humble creatures have become household pets, and their habits have been carefully studied. It is only in the aquarium that they can be seen to advantage; for when exposed on their native rocks by the fall of the tide, they appear either like smooth lumps of opaque jelly or as mere sand-coated excrescences. In each hemispherical or conical lump, however, a puckered hole, indicating the position of the mouth, can generally be detected. When placed in their proper element, and allowed to remain undisturbed, the sea-anemones gradually unfold their tentacles, and prepare to take into their elastic stomachs any dainty morsels which come within their reach. They are extremely voracious, and though apparently mere masses of jelly, they can digest almost anything. The tentacles seem to have the power of benumbing the prey, for little worms seized by them struggle for a few moments, and then become paralysed. A slight tingling or pricking sensation has been felt by some observers on touching the tentacles with the hand, and the microscope has revealed the existence of little coiled-up threads, which are believed to be the stinging organs. A strong light annoys these curious creatures, though no special organs of vision have been detected in them. The sea-anemones have an extraordinary power of reproduction; they may be cut perpendicularly or across, and each cutting will give origin to a new animal. They produce living young, which issue from the mouth, and fix themselves upon adjacent rocks. They also have the power of reproducing their kind by gemmation, or budding. The commonest British species is *Actinia mesembryanthemum*, the smooth sea-anemone, which is usually dark red or green. When left by the tide, it appears like a tiny mould of jelly, but if touched, it is found to be of a leathery texture, firm enough to withstand considerable pressure. The tentacles are slender and very numerous; and around the margin of the mouth there is a circle of azure tubercles, resembling turquoise beads. The species *Actinoloba dianthus*, so called from its resemblance, when fully expanded, to the carnation, or *dianthus*, is generally pure-white, or slightly tinted with cream or rose-colour. It is considerably larger than the smooth sea-anemone, and is the most coveted species of sea-side naturalists. *Tealia crassicornis*, the thick-horned animal-flower, has fewer tentacles than the creatures we have mentioned, and these organs are beautifully translucent, and marked with coloured rings. It is one of the largest, and certainly the most curious of our British sea-anemones. There are a great number of species, besides the three named above, found on our coasts.—*Ref.* Gosse's *History of British Sea-Anemones*; Johnston's *British Zoophytes*.

Angel-Fish (*Squatina angelus*.)—This curious fish, which is common on the British coasts, derives its name of angel-fish from its pectoral fins having some resemblance to wings. It is remarkably ugly, having a large head and capacious mouth, set with five rows of teeth, which are broad at the base, and sharp and pointed above. Like the rest of the shark tribe, these teeth, by the aid of muscles, are capable of being raised and depressed. It has small eyes, set in a crescent-shaped orifice. The back is very rough, and of a gray colour; the belly is white and smooth. It is an extremely voracious fish; and, lying at the bottom of the water, preys upon the smaller fish which abound there. It measures about eight feet in length, and weighs about a hundred pounds. Formerly its flesh was considered a delicacy; but modern epicures pronounce it coarse and unpalatable. The skin of this fish is used by cabinet-makers for polishing purposes, and is also made into a fine kind of shagreen. The peculiar structure of this fish has gained for it two other names, by which it is frequently known. By some it is called the monk-fish, because its head appears to be enshrouded in a hood. The term fiddler-fish has also been given it, although its shape bears little resemblance to that musical instrument. A species, (*Squatina aculeata*,) which has a row of spines along the back, is found in the Mediterranean. This fish belongs to the order Chondropterygii, and is a kind of link between the sharks and the rays.

Angler-Fish (*Lophius piscatorius*.)—The angler-fish is known also as the sea-devil, fishing-frog, and toad-fish. Judging from its appearance, the name fishing-frog would seem to be the more correct appellation, as it more resembles a gigantic tadpole than anything else, and a very ugly tadpole to boot, as it is, almost without exception, the most ungainly-looking fish in creation. Its head, which forms quite half of its body, is flattened on the top, and the mouth extends nearly the whole width of the head, on the top of which are placed, pretty closely together, its two large black eyes. The nostrils have no external orifice, but two internal ones, answering the same purpose. The lower jaw of the angler is considerably longer than the upper; both are provided with rows of sharp conical teeth. The upper parts of the body are of a brown colour, the lower parts white. The pectoral and ventral fins are of the same colour, and the tail is nearly black. The angler, being a voracious fish, and at the same time far from an industrious one, is compelled to resort to artifice to obtain a living, and the *modus operandi* is somewhat singular. Affixed to the front of its head are two bony filaments, the foremost one dilated at the tip, and having a silvery lustre. Firstly, *Lophius piscatorius* settles itself comfortably at the bottom of the water, and, shaking up the mud or sand a bit, makes the water somewhat turbid. Having thus hidden its ugly person from the gaze of squeamish fish, who might take an objection to its appearance, and hence keep clear of its locality, it lazily flutters the appendage aforesaid to and fro in the water. The bait easily takes, and small fish, who imagine they are about to make a meal of the little shining worm, find themselves in a twinkling in the capacious jaws of the angler. Not always, however, does it obtain its food in the manner described; but sometimes exhibits a boldness which certainly seems more in unison with its bloodthirsty appearance. Mr Yarrell relates two such instances. In one case, a cod had been hooked by a fisherman, and, on being drawn to the surface, he was astonished at finding an angler hanging to it. So tenacious did it keep its grip on the cod, that he was compelled to strike it a severe blow before it would quit its hold. Another time, an angler had seized a conger eel, and the latter had wriggled itself into the bronchial aperture of its captor. In this condition they were both brought to the surface. The average size of the angler is about three feet, although it has been known to attain a length of five feet. In itself the fish is of no value; but many of the fish found in its stomach are generally quite uninjured, sometimes alive; and the fishermen frequently make a little money by exhibiting the fish itself to seaside visitors, generally accompanying their exhibition with a most doleful lamentation upon the ravages committed by their not very prepossessing captive. Closely allied to the foregoing species are several others:—1. The Cornish angler (*Lophius cornubicus*;) 2. The muricated angler (*Lophius muricatus*;) 3. The beaked angler (*Lophius rostratus*;) 4. The harlequin angler (*Lophius histrio*;) 5. The striped angler (*Lophius striatus*;) 6. The marbled angler (*Lophius marmoratus*.) This fish belongs to the Acanthopterygii.—*Ref.* Yarrell's *British Fishes*.

Angora Cat. (*See* Cat.)

Angora Goat, *ăn-gor'-a*, a beautiful animal, native of Angora, a mountainous city in Asia Minor. These goats have fine, soft, silky hair, quite eight inches in length. From this goat-hair a sort of yarn, called camel-yarn and Turkish-yarn, is made. The term *camel* is often erroneously supposed to be derived from the name of that animal; it comes, however, from the Arab, *chamal*, fine. The skin of the Angora goat also yields that fine kind of leather known as oriental morocco. (*See* Angora, vol. I. of this work.)

Anguilla. (*See* Eel.)

Anguis. (*See* Blind-worm.)

Anhinga. (*See* Darter.)

Anis, *ah'-nees*, a group of South American birds allied to the cuckoos. The Savannah blackbird is a well-known example of this genus.

Animal, *ăn'-i-mal*.—The law distinguishes animals into such as are *domitæ* and such as are *feræ naturæ*, some being of a tame, and others of a wild disposition: the former consisting of such animals as we generally see tame, and are therefore seldom or never found wandering at large; and the latter of such as are usually found at liberty.

Animal Chemistry, that branch of science which treats of the different changes going on in the living animal; such as the change of the egg, consisting of white, yolk, and shell, into the flesh, blood, bones, and feathers of the young bird. The processes of respiration, digestion, and assimilation of food, are purely chemical operations. The principal chemical substances necessary for the support of the different functions of the animal system, are oxygen, hydrogen, carbon, nitrogen, sulphur, phosphorus, and chlorine, and the metals iron, sodium, potassium, lime, and magnesia. These are all received into the system in the form of food, and become distributed to the different parts of the body during the process of digestion and assimilation; as, for example, the iron to the blood and hair, the lime and phosphorus to the nails and bones. If any of these substances are wanting, the system suffers, and they must be restored to the patient. For instance, rachitis, or rickets, in children is caused by the bone containing too little lime; and the best remedy, therefore, in its earliest stage is plenty of lime-water, or some other substance containing lime. The following analysis of different parts of the human system will be interesting, as showing the destination of these different substances:—

Bone.		Hair.	
Animal matter......	31	Carbon..................	51
Phosphate of lime..	59	Hydrogen............	7
Fluoride of calcium	2	Nitrogen..............	17
Carbonate of lime...	7	Sulphur................	3
Phosph. of Magn...	1	Oxygen................	22

Blood.		Flesh.
Water................	779	Coagulated fibre.
Fibrine...............	2	Water, three-fourths.
Fatty matter........	2	Albumen.
Albumen............	69	Phosphoric acid.
Iron and salts......	7	Phosphates.
Blood corpuscles..	141	Chlorides.

The modern discoveries of animal chemistry have thrown great light upon the vital functions, and the laws governing them. The researches of Liebig and others have also tended to purge medicinal science of much of its rubbish, and prescriptions are now compounded by men knowing the chemical value of their ingredients. (*See* Blood, Bone, Respiration, &c.)

Animal-Flower, the genus Actinia. It bears some resemblance to a flower with a radiated disc; its tentacula are disposed in regular circles, tinged with a variety of beautiful bright colours, as the marigold, anemone, &c. (*See* Anemone, Sea.)

Animal Heat is that heat which is generated in the bodies of living animals, by which they are enabled to maintain a certain temperature, independent of that of the atmosphere or other medium by which they are surrounded. Heat is one of the conditions necessary to life, and, when that is reduced below a certain point, all vital activity ceases. The sun is the great source of heat, and on it vegetables and the greater number of tribes of animals principally depend. There are certain tribes of animals, however, especially birds and mammals, which possess the power of generating heat within themselves to such a degree as to render their vital functions almost entirely independent of external influences, and there is probably no species that can exercise this power more effectually, and through a greater range of conditions, than man. Judging merely from our sensations, we should be led to conclude that our bodies undergo very considerable changes of temperature. Such, however, has been proved not to be the case. From a series of 114 observations made by Dr John Davy, on persons of different ages and sexes, and in various latitudes, it was found that the mean temperature of the body was 100°, in a mean atmospheric temperature of 74°; the highest temperature of the body being 102°, while the highest atmospheric temperature was 82°, and the lowest temperature of the body 96·5°, while the lowest temperature of the air was 60°. The mean age of all the individuals was 27. In favourable circumstances, the temperature of infants is somewhat higher than that of adults; but, in their power of resisting the depressing influence of external cold, the former are much inferior to the latter. External cold reduces the temperature of the body considerably, especially if at rest. Thus Dr Davy found the temperature of his own body reduced, on an average of four observations, to 96·7°, with the average temperature of the surrounding air at 37°. An increase of temperature takes place after exercise, as well as after a meal. The usual temperature of the body occasionally undergoes considerable change in disease, from 106° in fever to 67° in cholera. The mean temperature of birds is rather higher than that of mammals, averaging about 108°, while mammals average about 101°. Animal heat arises from the various changes that are constantly going on within the bodies of the animals. Every change that takes place in the condition of the organic components of the body, in which their elements enter into new combinations with oxygen, is necessarily a source of the development of heat. By the union of the oxygen of the atmosphere with the carbon and hydrogen of the body, a species of combustion takes place, and heat is evolved. Hence we find that the more rapidly this combustion is carried on, the greater the amount of heat produced; and hence exercise increases the heat of the body. Some have held that combustion was not sufficient to account for the total amount of heat generated in a living body; but the most recent authorities are now generally agreed that such is the case, especially when we take into account the small quantities of sulphur and phosphorus which also undergo oxidation within the system. But, while a low degree of heat destroys vital activity, not less destructive to it is a high degree of heat. By a wise provision, therefore, the body has the power of maintaining itself in a moderate state of heat, even when surrounded by a very hot medium. Thus Banks, Blagden, and Fordyce, exposed themselves to a heat of nearly 260°, and found that their bodies had preserved nearly their own temperature. This is owing to the cutaneous and pulmonary evaporation which takes place. Animals placed in a hot atmosphere so saturated with humidity that no evaporation could take place, could not support heat but little greater than their own without perishing.

Animal Kingdom.—This term is commonly applied to one of the three primary divisions of Nature, the other two being called respectively the *Vegetable kingdom* and the *Mineral kingdom.* All organised beings are included in the first and second, and all inorganic bodies in the third division. This arrangement of natural objects into three great departments is very ancient; indeed, there is every reason to believe that it was one of the earliest classifications devised by the human mind. The general differences between animals, plants, and minerals are so striking, that they could not long have escaped the attention of wondering and thoughtful man. With the increase of knowledge, however, the line of demarcation between the two organic kingdoms has gradually been obliterated; and at the present time we may seek in vain for a character by which an animal may at once be distinguished from a plant. The mineral kingdom can easily be defined, as no inorganic body has the characters which we may recognise in any organised being. A plant or an animal, however lowly, may be distinguished from a mineral by its cellular structure. All its parts originate in and are formed out of cells (*see* CELL ;) and each part so produced is dependent on the others. A mineral body is merely an aggregate of homogeneous particles, and it has no special parts or organs. Again, a plant or animal exists as an individual being for a certain time, and has the power of producing other beings to take its place when that time has expired. A mineral, on the other hand, has no definite period of existence, but will remain unchanged as long as it is not acted upon by external forces sufficiently powerful to overcome the cohesion of its particles. The distinction between plants and animals, though evident enough when we regard those which are highly organised, is scarcely perceptible when we compare the lowest links of each chain of life. Indeed, many unpretending forms of life seem to occupy neutral ground, and may be claimed by the botanist and zoologist with equal right. Aristotle was the first naturalist who sought a distinction between plants and animals; and, in stating that an animal possessed a mouth while a plant had no such organ, he gave, perhaps, the simplest and most generally applicable definition that exists. The microscope has, however, quite upset the notion that the mouth is a necessary part of an animal. Linnæus attempted to define the three kingdoms by the following dictum :—"Minerals grow; plants grow and live; animals grow, live, and feel." To apply this definition, we must first define life and feeling; and this cannot be done in such a way as to effect the object of the naturalist. Cuvier thought the possession of a stomach a sufficient distinction for the animal kingdom; but, since his time, we have become acquainted with numerous microscopic creatures that have no special receptacles for food. Until very lately, chemical distinctions were much relied upon, as it was believed that the presence of cellulose (*see* this word) or of starch was a certain characteristic of a plant. This belief has, however, been proved to be erroneous by the discovery of these common vegetable constituents in the tissues of animals. Though we cannot give any absolute rule for distinguishing an animal from a plant, we can point to many striking differences between the two kingdoms, when we consider the functions performed by the members of each taken collectively. It is only in comparing particular individuals that we encounter difficulties. In a general sense, animals consume organic matter derived directly or indirectly from the vegetable kingdom, while plants obtain their nourishment from the mineral kingdom. Animals, by the process of respiration, absorb oxygen and breathe out carbonic-acid gas; while plants take carbonic acid from the atmosphere and eliminate oxygen. Thus the great functions of animal and vegetable life are antagonistic, and between them the circulation of matter is constantly kept up. Other characters of a more evident kind may be given, by which animals may generally be distinguished from plants. Thus animals have the power of voluntary motion, and wander about in search of food, which they digest in internal cavities or stomachs. Plants, on the contrary, are stationary, and absorb the substances by which they are nourished through their external surfaces. These characters, as we have before stated, are not absolute marks of distinction; for there are many animals that pass their existence in fixed positions, and many that are stomachless; while, on the other hand, there are many plants which move from place to place, as if gifted with volition.

In studying zoology,—that part of natural history which treats of the structure, habits, and habitations of all animals, from man to the humblest animalcule,—we find that a general plan or system underlies the innumerable diversiform beings included in the first kingdom of nature. To discover this plan has always been the highest object of the scientific naturalist, and the many beautiful schemes of classification which have been devised, are the results of investigations undertaken with this view. A very cursory inspection of the forms and structures of the different tribes of animals which are constantly presenting themselves to our notice, might satisfy us, that amongst all there are resemblances and differences; between some the similarity being the prevailing feature, whilst between others the differences are most obvious. In a crude shape, zoological classification must have been employed by the earliest human inhabitants of the globe. The first observers of nature must have seen that animals could be placed in natural groups, as the distinctions between quadrupeds, birds, fishes, and insects, are very obvious. Minor divisions must also have been made at a very early period; for instance, the division of beasts into herbivorous and carnivorous groups, and of birds into granivorous and carnivorous. Until the time of Aristotle, who has justly been termed the father of natural history, zoological classification was based upon obvious external characters, and was necessarily very imperfect. Aristotle's system was the first founded on the only sure basis—the organisation or physiological character of each animal. His method has been followed by all his successors, but we need scarcely say that his classification no longer holds a place in zoology. Between the systems of Aristotle and Linnæus, those of Ælian, Pliny, Athenæus, Albertus Magnus, Belon, Gesner, Aldrovandus, Johnston, Ray, and Buffon, were successively introduced; but as all these have long since been discarded, we need not consider their respective merits. By Linnæus the animal kingdom was arranged in six great classes; namely, *Mammalia* (sucklers), *Birds*, *Amphibia* (reptiles,) *Fishes*, *Insects*, *Vermes* (worms.) The primary distinctions between these classes are given in the following table :—

Heart bilocular (having two cells.) Blood warm, red.	Viviparous (producing young alive) …………	*Mammalia.*
	Oviparous (producing eggs)…	*Birds.*
Heart unilocular (one celled.) Blood cold, red.	Arbitrary lungs …	*Amphibia.*
	External gills……	*Fishes.*
Heart unilocular. Circulating fluid cold, white.	With antennæ……	*Insects.*
	With tentacula…..	*Vermes.*

The Linnæan system gave place to that of Cuvier, which is now followed so far as it agrees with recent discoveries. By Cuvier the animal kingdom was divided into four sub-kingdoms—*Vertebrata*, *Mollusca*, *Articulata*, and *Radiata*. Recent authorities have, however, divided it into five sub-kingdoms, by splitting the Radiata into two, and rearranging some of its constituents. The distinguishing characters of Cuvier's great divisions may be thus stated :—

Vertebrata.—The animals of this sub-kingdom are characterised by the presence of a backbone and bony skeleton. The blood is red, the heart muscular, and the mouth is furnished with two jaws, placed one either before or above the other. They have distinct organs of sight, hearing, and smell, situated in the cavities of the face, and they have never more than four limbs. The sexes are always distinct. In the nervous system we distinguish two great centres of power, the brain and spinal cord.

In the other three sub-kingdoms, which may be grouped together under the general head of *Invertebrata*, we place all animals void of backbone and bony skeleton.

Mollusca.—The animals belonging to this great group have no internal skeleton, the muscles being attached only to the skin, which constitutes a soft contractile envelope. The nervous system is contained within this general envelope, together with the viscera, and is composed of several scattered masses connected by nervous filaments. Of the four senses, only those of taste and vision can be distinguished, and the latter sense is frequently wanting. Snails, slugs, oysters, and mussels, are molluscous animals.

Articulata.—The nervous system of the third type of animal life consists of two long cords running longitudinally through the abdomen, dilated at intervals into knots, or ganglia. The organs of taste and vision are usually well developed. The envelope of the trunk is divided by transverse folds into a certain number of rings, to the interior of which the muscles are attached. The trunk often bears on its sides articulated limbs, but is frequently unfurnished with them. Worms and insects are included in this sub-kingdom.

Radiata.—In the radiate type the organs of sense and motion, instead of being arranged symmetrically on two sides of an axis, are disposed in rays round a centre. There is no very distinct nervous system, nor are there any organs of particular senses. This sub-kingdom embraces all those animals known as zoophytes, the star-fishes, and other lowly forms of life.

The following classification is taken from that given by Mr Jukes, in his "Manual of Geology," and which was supplied to him by Professor Huxley. The classification of the mammalia is that recently devised by Professor Owen. In examining this comprehensive scheme, the student must be guarded against taking the arrangement as strictly a linear one. The highest animals are doubtless placed first, and the lowest last, and this idea of subordination runs throughout ; but it is impossible to carry it out accurately in detail, since many of the orders should be arranged side by side, or, still more properly, in circles, in order strictly to express their mutual relations :—

SUB-KINGDOM—VERTEBRATA.

CLASS I.—MAMMALIA.

Sub-Class—*Placentalia.*

Orders.	*Examples.*
Bimana………………	Man.
Quadrumana.	
Catarhini………	Old-world monkeys.
Platyrhini………	American monkeys.
Strepsirhini……	Lemurs.
Carnivora.	
Digitigrada…….	Lion, wolf, hyena, weasel.
Plantigrada……	Bear, racoon, badger.
Pinnigrada…….	Seal, morse.
Artiodactyla.	
Nonruminantia.	Hippopotamus, pig.
Ruminantia……	Camel, stag, sheep, cow.
Perissodactyla.	
Solipedia……….	Horse.
Pachydermata. .	Rhinoceros, hyrax, tapir.
Proboscidea…………	Elephants.
Sirenia ………………	Dugong, manatee.
Cetacea………………	Whale, porpoise.
Cheiroptera.	
Frugivora………	Pteropus.
Insectivora…….	Bat, vampire.
Insectivora…………	Hedgehog, shrew, mole.
Bruta, or Edentata…	Sloth, armadillo, ant-eater.
Rodentia……………	Rat, hare, squirrel, beaver, porcupine.

Sub-Class—*Implacentalia.*

Marsupialia…………	Kangaroo, wombat, opossum.
Monotremata……….	Platypus, echidna.

Class II.—AVES.

Raptores ……………	Eagle, hawk, vulture, owl.
Scansores……………	Woodpecker, cuckoo, parrot.
Passeres……………	Thrush, sparrow, swallow, crow, lark.
Columbæ……………	Pigeon, dove.
Gallinæ………………	Fowl, grouse, partridge, turkey, peacock.
Cursores……………	Ostrich, emu, apteryx, bustard.
Grallatores …………	Crane, heron, plover, snipe
Palmipedes…………	Duck, albatross, gull, puffin, pelican.

Class III.—REPTILIA.

Chelonia ……………	Turtle, tortoise.
Crocodilia …………	Crocodile, alligator.
Lacertilia……………	Lizard.
Ophidia………………	Snakes.

Class IV.—AMPHIBIA.

Orders.	*Examples.*
Batrachia	Frog, toad.
Saurobatrachia	Proteus, siren.
Ophiomorpha	Ceilia (blind-worm.)

Class V.—PISCES.

Dipnoi	Lepidosiren.
Elasmobranchii	Shark, ray.
Ganoidei	Sturgeon, lepidosten.
Teleostei	Perch, cod, salmon.
Marispobranchii	Lamprey.
Pharyngobranchii	Amphioxus.

SUB-KINGDOM—ANNULOSA.

Class I.—INSECTA.

Hymenoptera	Saw-fly, ichneumon, bee
Coleoptera	Beetles
Neuroptera	Dragon-fly, white ant.
Strepsiptera	Stylops.
Lepidoptera	Butterfly, moth.
Diptera	House-fly.
Orthoptera	Cricket, locust.
Thysanoptera	Thrips.
Trichoptera	Caddis-fly
Dermaptera	Earwig.
Thysanoptera	Thrips.
Homoptera	Frog-hopper.
Heteroptera	Greater scorpia.
Aptera Aphani	Flea.

Class II.—MYRIAPODA.

Chilopoda	Centepede.
Chilognatha	Millipede.

Class III.—ARACHNIDA.

Pulmonata	Scorpion.
Amphipneusta	Spiders.
Trachearia	Acarus.
Pycnogonida	Pycnogonum.

Class IV.—CRUSTACEA.

Podophthalmia	Lobster, crab.
Edriophthalmia	Isopods, amphipods, læmodipods.
Branchipoda	Phyllopoda, daphnia, apus.
Copepoda	Cyclops, suctorial crustacea.
Ostracoda	Cythere, cypris.
Cirripedia	Barnacles.
Xiphosura	King-crab.

Class V.—ANNULATA.

Polychæta	Nereis, serpula, lob-worm.
Oligochæta	Earth-worm.
Discophora	Leech.
Tardigrada	Arctiscon.
Sagittida	Sagitta.

Class VI.—SCOLECIDA.

Trematoda	Fluke.
Tæniada	Tape-worm.
Acanthocephala	Echinorhynchus.
Nematoidea	Thread-worm.
Gordiacea	Hair-worm.
Turbellaria	Planaria.
Rotifera	Rotifer, brachionus, lacinularia.

Class VII.—ECHINODERMATA.

Orders.	*Examples.*
Holothuridæ	Sea-cucumber, trepang.
Echinidea	Sea-urchin.
Ophiuridæ	Sand-star.
Asteridea	Star-fish.
Crinoidea	Feather-star, stone-lily.

SUB-KINGDOM—MOLLUSCA.

Class I.—CEPHALOPHORA.

Dibranchiata	Squid, argonaut, poulpe.
Tetrabranchiata	Nautilus.
Pulmonata	Snail, slug.
Pteropoda	Clio, carinaria.
Gasteropoda diœcia, or Prosobranchiata.	Whelk, periwinkle, limpet, cowry.
Gasteropoda monœcia, or Opisthobranchiata	Tornatella, bulla, doris.

Class II.—CONCHIFERA.

Lamellibranchiata, or Acephala.	Cockle, mussel, oyster, venus, and all ordinary bivalve shells.

Class III.—MOLLUSCOIDEA.

Brachiopoda, or Palliobranchiata.	Lamp-shell, crania, orbicula, lingula.
Polyzoa, or Bryozoa	Flustra, eschara, retepora.
Ascidioida, or Tunicata.	Ascidia, botryllus, salpa.

SUB-KINGDOM—CŒLENTERATA.

Class I.—ACTINIZOA.

Alcyonaria	Alcyonium.
Zoantharia	Sea-anemone, six-starred coral, beroe.

Class II.—HYDROZOA.

Lucernaroida	Sertularia, and similar zoophytes.
Hydroida	Medusa, hydra.

SUB-KINGDOM.—PROTOZOA.

Class I.—STOMATODA.

Noctilucida	Noctiluca.
Infusoria	Paramœcium, vorticella.

Class II.—ASTOMATA.

Spongiadæ	Sponge.
Foraminifera	Rotalia, nodosaria.
Thalassicolidæ	Sphærozoum, thalassicola.
Gregarinidæ	Gregarina.

For an account of the distribution of animals over the globe, *see* DISTRIBUTION OF ANIMALS and PHYSICAL GEOGRAPHY. For the special distinctions of different classes of animals, refer to each of the names given in the above table.

ANIMALCULES, *ăn-i-măl'-ku-lees* (Lat. *animalculum*, a little animal.)—This is a general term for animals so exceedingly minute that they cannot be studied without the aid of the microscope; such as the species of *Infusoria* and *Rotatoria*. (*See* INFUSORIA, ROTATORIA.)

ANIMALS, AGE OF. (*See* AGE OF ANIMALS.)

ANNELIDA, *ăn-ne-lī'-da* (Lat. *annulus*, a ring; Gr. *eidos*, form), in Zool., a division of animals of the worm species, first proposed for distinct classification by Cuvier, who attached such importance to the fact of their possessing red blood, that he placed them at the head of the articulate series, above the crustaceans, the arachnidas, and the insects. It is, however, generally agreed that the annelida represent but the larval condition of insects, and can hardly be regarded as higher in organisation than the perfect insect. The name of the class is derived from *annulus*, a ring; because the animals arranged under this division always have their bodies formed of a great number of small rings as in the earth-worm. (*See* EARTHWORM.) For the most part, the annelida are oviparous. In their mode of life there is little variety: some live in fresh, others in salt water; some, like the hair-worm (*Gordius*), are amphibious. The body is divided into numerous segments, marked by transverse lines, and generally furnished with a series of bristly appendages, which serve as legs. The said bristles are usually sharp, and sometimes barbed, serving not only to attach the animals to soft substances, and to hold firmly on to rocks and other solid bodies, but to aid their movements through the water.

ANNULATA SEDENTARIA, *ăn'-nu-lai'-ta sed'-en-tair'-i-a*, a carnivorous tribe of worm-like animals, inhabiting a tube-shaped shell, which they never quit. They are usually found adhering to marine substances.

ANOA, *ăn'-o-a*, a ruminating animal of Sumatra, belonging to the genus Bubalus, and being therefore one of the buffaloes. Though small, it is very fierce, and can strike powerfully with the straight horns which are set nearly in a line with the forehead. It is mostly found on rocky grounds.

ANOBIUM. (*See* DEATH-WATCH.)

ANODON, *ăn'-od-on*, a snake of Southern Africa. The teeth are very minute, but their place is supplied by processes from the hinder vertebræ of the neck, which pass through holes in the membrane and project into the gullet. They are covered with enamel. The snake feeds on eggs.

ANOLIUS, *a-no'-li-us*, a genus of reptiles peculiar to America, supplying in many respects the place which the chameleon occupies in the old world. The colour of the skin, especially that about its loose baggy throat, assumes an endless succession of ever-varying hues, as the animal is disturbed by love or anger. The anolius, however, is more slenderly built than the chameleon, and more active in its movements. It varies from seven or eight inches to a foot in length, and is extremely tame and harmless. Its food consists of flies and other small insects. The head is long, straight, and flattened; the body and tail slender; and both are covered with small round scales, which give the skin the appearance of fine shagreen. There are several species of Anolius, and the reptiles belong to the family of Iguanidæ.

ANOPLOTHERIUM, *ăn'-o-plo-the'-ri-um*, (Gr. *a*, without, *oplon*, weapon, *therion*, beast,) in Geol., a gen. of extinct quadrupeds, established by Cuvier from bones found in the Paris tertiaries. Several species have been determined, the smallest having been little larger than a guinea-pig, and the largest about the size of a small ass. From the situations in which their remains have been discovered, these ancient inhabitants of our globe appear to have lived in herds in swamps and marshes. They all had slender legs and feet, with but two toes, as in the ruminants, and were the earliest bi-hoofed animals known to have existed on the earth. In some the tail was short and thick, and was probably made use of in swimming; in others it was short and slender. The dentition of the genus appears to have been very peculiar, each jaw having had six incisors, on each side of which was a small canine, and behind these, without leaving any interval, seven molars, resembling those of the rhinoceros. The common anoplothere (*A. commune*) has been taken as the type of a small natural family,—the *Anoplotheridæ*,—which appear to form a connecting link between the pachyderms, or thick-skinned mammalia, and the ruminants. Cuvier, in describing this typical species, showed that in one respect it stood between the rhinoceros and horse, and in another, between the hippopotamus and camel. The restorations of the anoplotheres and other ancient animals, by this great comparative anatomist, from the mutilated remains found in the gypsum-beds near Paris, may be regarded as one of the most splendid achievements of palæontology. The name *Anoplotherium*, which signifies "weaponless beast," was given to the genus from the fact that all the species seem to have been destitute of organs of defence, as tusks, claws, or horns.

ANOUS, *ă'-no-us*, a genus of Terns. The common Noddy is an example of this genus.

ANOPLURA, *ăn-o-plu'-ra*, a fam. of insects, in which are comprehended the *Aptera* of Linnæus and the many varieties of *Pediculus*, (*see* PEDICULUS,) as well as the parasitic insects of other writers. About 500 different forms of *Anoplura*, all of them parasitic—all of them bearing a close resemblance to the human parasite, the louse—have been described. As a rule, only one species of anoplura attacks a single species of animal; but in animals and gulls as many as five different species have been discovered.—*Ref.* Denny's *Anoplura Britannica.*

ANSERES, *ăn'-se-rees*, (Lat. *anser*, a goose,) an order of birds thus characterised:—A smooth beak, covered with skin, gibbous at the base, and broader at the point; feet formed for swimming, having palmated toes, connected by a membrane; the legs thick and short; the body bulky, plump, and downy. Food—fishes, frogs, aquatic plants, &c. (*See* GOOSE.)

ANT, *ant*, a well-known family of hymenopterous insects, which from the very earliest period of the world's history have attracted attention on account of their social and industrious habits, their love of order and subordination, and unremitting economy. Although so small, their muscular strength is extraordinary, and they will carry loads at least ten times their own weight, displaying meanwhile considerable activity. They have a triangular head; the antennæ are geniculate or elbowed; the jaws strong; the ligula, or lower lip, small, rounded, or spoon-like; the thorax compressed at the sides; the abdomen nearly oval, the pedicle which joins it to the thorax forming in some kinds a single and in some a double scale or knot. A community of ants, whatever the species may be, consists of males, which have always four wings; of females, much larger in size than the males, which only possess wings during the pairing season; and of a sort of barren females, which have been variously termed neuters, workers, or nurse-ants, and which, so far as is known, have never been observed to have wings in any stage of their existence. The nests of ants are differently constructed in the different species; all, however, are very curiously and regularly arranged. "If an ant-hill be examined any time after midsummer up to the close of autumn, there may be seen mixed with the wingless workers a number of both males and females furnished with white glistening wings. These, however, are neither kings nor queens in the state, at least so far as freedom of action is concerned; for they are not allowed to move without a guard of workers to prevent them leaving the boundaries; and, if one straggles away unawares, it is for the most part dragged back by the vigilant sentinels, three or four of whom may in such cases be seen hauling along a winged deserter by the wings and limbs. The workers, so far from ever facilitating the exit, much less the departure of the winged ones, more particularly the females, guard them most assiduously in order to prevent it, and are only forced to acquiesce when the winged ones become too numerous to be either guarded or fed. There seems, indeed, to be a uniform disposition in the winged ones to desert their native colony; and, as they never return after pairing, it would soon become depopulated in the absence of females. The actual pairing does not seem to take place within the ant-hills; and we have observed scouts posted all around, ready to discover and carry back to the colony as many fertile females as they could meet with. Nay, we are quite certain that whole colonies have thus been dispersed; and, when they did not find fertile females near their encampment, they have gone farther and farther, till they found them; and, if they had gone very far, never returned, but commenced a number of new establishments, according to their convenience. It is probable that, soon after pairing, the males die, as do the males of bees and other insects; for, as the workers never bring any of them back nor take any notice of them after leaving the ant-hill, they must perish, being entirely defenceless, and destitute both of a sting and of mandibles to provide for their sustenance. It was supposed by the ancients that all ants at a certain age acquired wings, but it was reserved for the younger Huber, in particular, by means of his artificial formicaries, to trace the development of the wings in the female, from the first commencement till he saw them stripped off and laid aside like cast clothes."—(*Broderip.*) The eggs of ants are so small as to be scarcely visible to the naked eye. Contrary to what takes place in most insects, the eggs when laid are not glued to any fixed place, but are dropped at random by the mother in her progress through the nest, and carefully collected by the workers, several of whom sedulously attend her during her period of laying. The collected eggs are taken to the various apartments of the nest adapted for the purpose, and there left for hatching. Heat being indispensable, the eggs are placed carefully during the day near the surface of the ant-hill, but so sheltered from the direct influence of the sun, as to prevent the too rapid evaporation of their moisture. As night approaches, the experienced insects to whom the care of the precious ova is entrusted, remove the eggs to warmer quarters, to prevent the escape of the heat they naturally possess.

Nor does the care of these tender nurses cease when the little ants come into life. At night they are carefully stowed away in the innermost chambers of the nest, every aperture being closed to prevent the ingress of cold air. But as soon as the rays of the morning sun fall upon the surface of the nest, the workers busily commence carrying their infants to the upper chambers, where, close under the roof, they may enjoy the genial warmth. Not unfrequently, they even place them for a time on the outside of the nest, exposed to the direct rays of the sun. During their grubhood, the little creatures are fed by the nurses, or by the mother herself, by a liquid disgorged from the stomach. When the grubs are full grown, they spin cocoons of a membraneous texture, and of a brownish-white colour, in appearance not unlike barleycorns, for which, indeed, they were mistaken by early observers. Hence, doubtless, arose the belief that the insect laid up a store of grain in the summer season, to serve for its support in the winter. It is certain, however, that our European ants are carnivorous in their habits. Says the Rev. J. G. Wood, "Ants do not, as has been frequently said, lay up stores of corn for the winter, for they are in a state of torpidity during the winter months, and require no food. Moreover, an ant would find as much difficulty in eating and digesting a grain of corn as we should in devouring a truss of straw." The vegetable substance which ants appear chiefly to use as food is sugar, and to this, wherever it is to be found, they seem to be guided by a very acute sense of smell. *Honey-dew*, the saccharine excrescence of the *aphides*, is a favourite food of many species. Not only do the ants climb plants on which *aphides* are to be found, but should they find the creature and not his saccharine produce, they will, with their antennæ, pat the aphis on either side of the abdomen until the desired drop is yielded, and then pass on to another. Linnæus quaintly styles the aphis the ant's *milch-cow*. It is even related that the ant seems to regard the aphis as his particular property, and is prepared to do battle to the death with any other ant that seeks to dispute its title; and that the *Aphis radicina*, which derives its food from the roots of grass and other plants, is not uncommonly taken into custody by the yellow ant, (*Formica flava*,) and maintained in its nest, as a farmer might procure a herd of cows and house them in his sheds. That these stories are beyond dispute is not insisted, still, when the wonderful instinct of the ant is considered, it is too much to reject them as altogether incredible. Indeed, it should be sufficient to find Huber among those who mention this farmer-like habit of the ant, to entitle the statement to serious consideration. The habitations of ants are very curiously constructed, and display great ingenuity. Houses built by the common wood-ant (*Formica rufa*) are sometimes as large as a small haycock. They are generally found in the vicinity of some large tree on the bank of a stream; such a site affording them both food and the moisture requisite for building purposes. The ant-hill is of a conicle shape, and composed of leaves, scraps of wood, earth, &c. At the commencement the nest is simply an excavation made in the earth; a number of the labourers wander about in quest of materials suitable for the superstructure, others carry out particles of earth from the interior, which are replaced by the bits of wood and leaves other labourers bring in, and which the builders properly arrange. Care is taken that space is left for the galleries that lead to the interior, while the dome contains a number of spacious apartments communicating with each other by means of galleries similarly constructed. To the superficial observer the exterior of an ant colony presents the appearance merely of a careless heap, the result rather of chance than of design. Minute inspection, however, would invariably discover it to be the very perfection of architecture, in which the attacks of enemies, the effect of wind and flood, and the rays of the sun, have been thoroughly provided against in the building. "I was in the habit of visiting almost daily a nest of red ants, of which a large flat stone formed the roof. During my visits for the first three weeks, scarcely a drop of rain had fallen, and the nest seemed considerably injured by the continued falling of loose earth, which these little creatures, with amazing industry, removed whenever it happened that any of the avenues were blocked up. No attempt was ever made towards reparation; but what was my surprise, on visiting my little friends after two days' heavy rain, to find that the repairs were already completed, and that the upper surface of their habitation presented as smooth an appearance as if a trowel had been passed over it. Yet all their work they had industriously effected by kneading with the rain-water the loose earth into a sort of paste. From the nest being situated in the midst of an extensive heath, where there could be no supply of water, and from its remaining unrepaired during the dry weather, it amounts to a full conviction, that ants employ no other cement than water in the construction of their varied habitations. I have often been surprised at the ingenuity of these little creatures in availing themselves of contiguous blades of grass, stalks of corn, &c., when they wish to enlarge the boundaries of their abode. As these are usually met with in the erect position, they are admirably calculated for pillars; they therefore coat them over with a fine paste of earth, giving them, by additional layers, the solidity they judge necessary for the work on which they are engaged; they then leave them to be consolidated by the wind, and afterwards spring a number of arches from pillar to pillar, and thus form an extensive saloon. Should they be at any time in want of small apartments, they have only to prepare a quantity of moistened earth, and by placing this between the pillars, and carrying it up to the roof, leaving here and there an aperture for entrance, their object is completely attained." —(*Dr J. R. Johnson.*) Ants are very pugnacious, and many dreadful battles take place among them. Party meets party, and after the fray may be found limbless trunks, and trunkless heads, and combatants fast locked in each other's embrace, and quite dead. More extraordinary than all, however, is the fact that some species of ants go on regular forays to carry off the eggs and grubs of other species, which they carry into captivity, and rear as bond ants and slaves for the rest of their lives. The best known of these marauders are the Sanguinary Ant (*Formica sanguinea*) and the Amazon Ant, (*Formica rufescens.*) It has been noticed as a rather singular circumstance, that in both cases the kidnappers are red or pale-coloured ants, and the captives jet black. The tyrants march forth attended by scouts, and when the unsuspecting colony of negro ants is reached, there ensues a tremendous fight, in which the negroes are certain to be worsted. Thereupon, the conquerors assail the now undefended ant-hill, rend its walls with their powerful mandibles, seize the pupæ in their mouths, and march home again in triumph. The slaves are not ill-treated, but live as do human slaves, the only reward for the labour of their lives, being such food and lodging as their masters please to bestow.—*Ref.* Gould's *English Ants;* the works of Baron de Geer, Huber, Latreille, Kirby and Spence's *Entomology*, &c.

Ant, White, in Zool., an extensive and important fam. of the *Neuropterous* ord., chiefly confined to the tropics, where they perform no inconsiderable share in the necessary business of removing from the earth's surface the carrion that cumbers it. Their right name is Termite. Like the common ant, the white ants live in communities, and are, like them, omnivorous. Like the familiar "little brown ant," too, the white tropical insect is, at a certain period of its existence, furnished with wings to expedite its emigration. At no time, however, does the general form of the two insects agree. The antennæ of the white ants are thread-shaped, and composed of about twenty joints, and the eyes are rather small, but prominent; the body is depressed, and the mouth very similar to that of the *Orthoptera*, with the four-cleft lower lip, the wings slightly transparent, and the legs short. As destroyers they certainly deserve place next to the locusts. Should they attack a building, composed wholly or partly of wood, it is doomed;—truly, when they leave it, as being of no further use to them, it will not have altered much in appearance; but examination will discover the substantial beams to be mere shells, and the pillars as hollow and unstable as reeds. Your gun that hangs against the wall will drop barrel from stock at the slightest handling, and your sword show itself naked, through its leather sheath being eaten up. Nothing is safe from the white ant's insatiable appetite. Their tactics in attacking a building are very peculiar. While some of them are busy gutting the timbers that support it, others ascend from them, entering a rafter or some other part of the roof, in search, as it would seem, of the thatch, which they appear to relish more than any other portion of a house. If they find it, they bring up wet clay, and build galleries through the roof in various directions as long as it will support them. In this manner a wooden house is speedily destroyed, and all that is contained in it is, at the same time, subjected to their ravages. "In carrying on this business, they sometimes find, by some means or other, that the post has a certain weight to support, and then, if it is a convenient track to the roof, or is itself a kind of wood agreeable to them, they bring their mortar, and as fast as they take away the wood replace the vacancy with that material, which they work together more closely and compactly than human art could ram it. Hence, when the house is taken to pieces in order to examine if any of the parts are fit to be used again, those made of the softer sorts of wood are often found to be mere shells; and almost all of them are transformed from wood to clay, as solid and as hard as many kinds of stone used for building purposes."—(Smeathman's *Account of the Termites of Africa.*) It is of this "mortar"—earth or sand agglutinated together—that are built those wonderful edifices known as ant-hills. When Dr Livingstone was engaged in his first African exploration he witnessed several instances, not only of this mysterious insect architecture, but also of the important part they play in the scheme of nature. He tells us that the country between Linyanti and Seshella is flat, except patches elevated only a few feet above the surrounding level. "There are also many mounds, where the gigantic ant-hills of the country have been situated, or still appear. These mounds are evidently the work of the *Termites*. No one who has not seen these gigantic structures can fancy the industry of these little labourers. They seem to impart fertility to the soil which has once passed through their mouths; for the Makolo find the sides of the ant-hills the choice spots for rearing early maize and tobacco. In the parts through which we passed, the mounds were generally covered with wild date trees." The fecundity of the female of this species is truly wonderful. She and her partner are incarcerated in a cell by the neuters, and are there regularly supplied with food; and, after impregnation, on the enlargement of the ovaries, her abdomen swells to the enormous size of nearly *two thousand* times the rest of her body. As soon as she begins to lay eggs, they are conveyed away by the neuters to the prepared cells, which, in conjunction with the magazines of provisions, occupy the interior of their nests. It is said that she lays as many as 80,000 of these eggs in the course of twenty-four hours. So marvellous a fecundity would speedily overwhelm the earth, did it not happen that comparatively few reach maturity, and that birds, beasts, and fishes devour them in shoals. The true ants, however, are their worst enemies, and prey on them with the most savage voracity, especially at the period of their swarming. When roasted they are said to be palatable as food, and as such to be highly esteemed by the natives. A Bayeye chief, who paid a ceremonial visit to Dr Livingstone's camp, was offered some bread and apricot jam. "Did you ever eat anything so good?" inquired the doctor. "Ah!" responded the chief, "you should try roast white ants."

ANTAGONIST MUSCLES, *ăn-tăg'-o-nist* (Gr. *anti*, against, *agonistes*, a combatant,) in Anat., are those muscles which act in opposition to each other; as flexors and extensors, abductors and adductors.

ANT-EATER, GREAT (*Myrmecophaga jubata* of Linnæus.)—This curious creature, sometimes called the ant-bear, is an inhabitant of most of the tropical parts of South America east of the Andes. It is the largest of the edentata, measuring four feet and a half from the tip of the snout to the root of the tail; while the latter member measures nearly three feet in length. These, at least, were the dimensions of the full-grown female lately at the Zoological Gardens. The head of the great ant-eater is extended into a long snout covered with skin, with only a very small opening at the tip for the protrusion of the tongue; its ears are very minute; its legs, especially the anterior ones, very stout and strong, and armed each with four long claws, which turn inwards against the sole of the foot. The hind feet are provided with a broad sole, and it is probably from this circumstance that the animal derives its occasional name of ant-bear. The body is covered with bristly hair, which, on the tail, grows to such a length as to sweep the ground. When composing itself for sleep, the ant-eater curls its body, and so enwraps itself in its bushy tail, as to present the appearance of a heap of withered grass rather than a living animal. It is said that the animal resorts to the shelter of its tail as a protection from the rain, and that the Indians, on overtaking this sort of game, make a rustling among the forest foliage, to resemble the pattering of rain; whereon the ant-eater hastens to wrap itself in its tail, rendering it an easy matter for the stealthy savage to approach and knock it on the head. This precaution is not unnecessary; for, despite the animal's harmless appearance, it has a habit of suddenly rising, bear-fashion, and clasping its assailant round the waist, lacerating him fearfully with its powerful claws. The natural food of the ant-eater is the white ant that abounds on the banks of lakes and rivers in tropical South America. Assailing the nests of the industrious little insects with its heavy-armed fore-paws, it puts the entire colony in confusion, and then thrusting amongst them its nimble tongue, capable of protrusion to the extent of a foot and a half, withdraws the adherent ants into its maw, repeating the operation till they are all consumed, or the ant-eater's appetite satisfied. The ant-eater's tongue is composed almost solely of ring-like muscles, and is altogether worm-like in appearance. The surface is endued with a viscous matter, to which the ants and termites become helplessly attached at the slightest contact. Without this providential arrangement, the animal would find subsistence next to impossible, as its mouth is extremely small, and it possesses no teeth. The latter is the case with the majority of the edentata.

ANT-EATER, PORCUPINE. (*See* ECHIDNA.)

ANT THRUSH, a bird belonging to the thrushes, and inhabiting America and parts of the Old World. The short-tailed ant thrush (*Pitta bengalensis*) is very common in Bengal.

ANTECHINUS, *ănt-e-kī'-nus*, a genus of marsupials found in Australia. They are popularly known as pouched mice, and are very elegant and graceful. Their average length is eight inches, of which the tail occupies three. The two middle incisors are equal to the others in size.

ANTELOPE, *ăn'-te-lope*, (Lat. *antilope*,) a large group of ruminating mammals, comprising many species; and, although differing in many particulars, agreeing in certain important characteristics. These are principally as follows:—In the form of the horns, which are without angles and ridges, as in the sheep and goat, but of a round and annulated nature. Excepting in this particular, the horns of the antelope genus widely differ: while those of one species are perfectly straight, another will exhibit curved or spiral horns. In some species they are peculiar to the male alone; in others, the female is endowed with these handsome appendages as well as its mate. All the antelopes are remarkable for their delicate sense of smell. It has been supposed that this is owing to their possession of "lachrymal sinuses," or "tear-pits," and that these organs communicate with the nostrils. The anatomy of the parts fully proves that this theory is incorrect, and that there is no internal communication between the lachrymal sinus and the nose. Although the antelopes are not the only animals which possess sub-orbital sinuses, they are the only members of the hollow-horned family that exhibit this character. The females are furnished with two and sometimes four teats, and the period of gestation varies from five to eight months. One, and occasionally two, are brought forth at a birth. From the most remote ages, the eyes of this genus have been a peculiar theme. The Greek and Roman name of the gazelle, *dorcas*, is derived from the verb *derkomai*, I see. Even the English name of the genus, antelope, is a corruption of the term *antholops*, literally "bright eyes." We are, moreover, informed by Bochart, that the Scriptural name, *tabitha*, is derived from *tzebi*, the Hebrew name of the gazelle, which alludes to the brightness of its eyes. The same image is frequently employed by Eastern poets, and also by our modern versifiers, the soft and subdued beauty of the gazelle's eyes often being compared to those of the timid and blushing maiden. As a rule, the hair of the antelope is smooth and short, and of an equal length; but, in some species, they have manes on the neck and shoulders; others, as the gnu, are provided with a beard on the throat and chin. The ears are long and pointed, growing in the inside of which are long white hairs, forming five longitudinal lines, with four black spaces between. The tails are short, tufted at the extremity. This genus, as a rule, is gregarious, uniting in large flocks of thousands; but, in some instances, spending their lives in solitary pairs. When associating in large numbers, great caution is taken to prevent surprise, and sentinels are constantly kept on the alert. Their wariness in this particular, combined with their acute sense of smell and sight, renders them somewhat difficult game, tasking the patience and temper of the hunter to the fullest extent. The hunting-grounds of Africa contain the largest number of these animals; Asia furnishes several species; Europe supplies but a small quota; and the gigantic extent of pasture-land in the New World can boast of but a single species. Australia and Madagascar are totally destitute of antelopes, as of all indigenous ruminants. With regard to the habitat of the antelope, it is far from a uniform nature; the general characteristics are as variable as the structure of the animals. While some species delight in the parched and arid desert, feeding upon such bulbous plants as the nature of the soil affords, others find a home on the open plains, on the steppes of Central Asia, or karroos of Southern Africa. Another species prefers the mountainous districts, and exhibits all the ease and agility of the wild goat in their rocky home. The dense and mighty forests of tropical Africa provide a home for some other species. The whole of the antelopes were at one time included under the general head *Antilopeæ*. Modern discoveries have so largely augmented the group, that it has been necessary to class them into subdivisions, as follows:—1. True antelopes; 2. bush antelopes; 3. capriform (or goat-like) antelopes; 4. bovine (or ox-like) antelopes. The two great divisions into which they are divided are, the *antelopes of the field* and the *antelope of the desert*. They are principally distinguished in the former by the absence of hair on the nostrils, whilst the same organs of the latter division are covered within with hair or bristles. It is true, the subdivisions have been quadrupled by modern zoologists: but, as an eminent authority remarks, "the genus antelope has become a kind of zoological refuge for the destitute, and forms an incongruous assemblage of all the hollow-horned ruminants together. So diversified are its forms, and so incongruous its materials, that it presents not a single character which will either apply to all its species, or suffice to differentiate it from conterminous genera." The antelopes would appear to be the connecting link between the deer and the goat. In the peculiarity of never shedding their horns they resemble the goat; on the other hand, their fleetness, the colour and texture of their hair, their general structure in fact, place them near the deer tribe. The general colour of the common antelope is brown on the back, and white under the belly, variegated with black stripes. With regard to the size of the antelope, while one of the largest species are some five or six feet in height, there is a singular little variety,—the pigmy antelope, which scarcely measures nine inches. The whole tribe amount to about eighty species. Antelope flesh forms a considerable portion of the native's larder, as well as affording food to some thousands of the carnivora. In cases of severe drought, they have been known to sweep down on the cultivated fields of the colonists in such flocks as to cause fearful devastations.—Ref. *English Cyclopædia*—Nat. Hist.

ANTENNARIUS. *See* WALKING-FISH.

ANTENNÆ, *ăn-ten'-ne*, (Lat., a yard-arm,) in Ent., those slender bodies with which the heads of insects are furnished, being synonymous with what are called feelers or horns. (*See* BEE, INSECT, &c.) For the several varieties of antennæ,—*Ref.* Kirby and Spence's *Introduction to Entomology*.

ANTERIOR, *ăn-te'-ri-or*, before either in time or place. In Anat. it is often used to designate parts which are situated before others, and is thus opposed to posterior; as, the anterior lobes of the brain, the *anterior intercostal nerve*.

ANTHELIX, *ăn-the'-lix*, (Gr. *antihelix*, from *anti*, opposite to, and *helix*, a spiral,) in Anat., is an eminence on the cartilage of the ear, situated before, or more properly within, the helix, or outer circle of the ear. It consists of two ridges as its upper part, which unite as they descend.

ANTHOZOA, *ăn'-tho-zo'-a*, (Gr. *anthos*, flower, *zoon*, animal,) a class of that division of the animal kingdom termed *zoophytes* (animal-flowers.) The *anthozoa* are divisible into three orders,—*A. hydroida*, *A. asteroida*, and *A. helianthoida*. These so-called animal-flowers apparently, but not in reality, combine the animal and vegetable in their nature; for they possess the sense of touch, the power of voluntary motion, and usually feed on matters which they have swallowed or sucked in, digesting them in an internal cavity; thus completely exhibiting the attributes of an animal. (*See* ACTINIA and ZOOPHYTES.)

ANTHUS, a genus of birds belonging to the family Luscinidæ. They inhabit most parts of the world, and are popularly called pipits.

ANTIDORCAS. (*See* SPRING-BOK.)

ANTLER, *ănt'-ler*, in Zool., the term applied to the horn of the *Cervidæ.* Until the deer is a year old, nothing but a slight protuberance marks the places where the antlers sprout. In the second year the horn appears, and is called the *brow antler;* the next year it has a branch, and is known as the *bay antler;* the fourth year it has two branches, and is a *tray antler;* the fifth, another branch and a new name, *crockets;* and again, at the sixth year, when the antler is perfect, and is called a *beam antler.* The deer's antlers are shed in the spring; and, considering their size and weight, are renewed in an astonishingly short time. A full-grown stag's horn probably weighs twenty-four pounds; yet this large mass of true bone is reproduced in about ten weeks. The development of the deer's antlers is intimately connected with the sexual system. (*See* DEER.)

ANT-LION, *ănt'-li-on, (Myrmeleon formicaleo,)* (Gr. *murmex*, ant, and *leon*, lion,) an insect of the ord. *Neuroptera*, celebrated for its wonderful ingenuity in constructing a pitfall for the destruction of its prey. As soon as the young larvæ are hatched, they at once set about providing for their future sustenance. This is effected by turning round and round in the sand till a small cavity is made, which, as the animal increases in size and strength, grows broader and deeper. At the bottom of this pit the ant-lion patiently remains, till some unsuspecting insect, arriving at the edge of the trap, thinks there can be no harm in exploring it. The sides of the pit, however, are so arranged as to afford foothold not even to the tiniest insect, and down rolls the little victim into the trapper's clutches; or, should it manifest any intention of escaping, a shower of sand, thrown up by the ant-lion, at once arrests its progress, and brings him tumbling to the bottom again. It is entirely on the juices of insects that this voracious creature lives. The empty carcases are not allowed to encumber his abode. As soon as he has exhausted their fluids, he balances them in his strong jaws, and tosses them out. The larva remains in this condition during two years; at the end of which time, having attained its full growth, it spins a cocoon, and takes the chrysalis form. Three weeks afterwards, it emerges a perfect insect. The ant-lion is, when full-grown, about half an inch in length, and somewhat resembles the dragon-fly. It has a very large abdomen and a very small head, which, however, is furnished with a pair of formidable incurved mandibles. It has six legs, but is incapable of rapid locomotion, and generally moves backwards. The perfect insect deposits its eggs in dry sandy situations, when the young larvæ, immediately after being hatched, begin, as we have seen, to exercise an astonishing instinct in luring insects to their doom. The *Myrmeleon formicaleo* is not found in England, but occurs in many parts of the continent, as France, Germany, Spain, &c.

AORTA. (*See* ANATOMY.)

AOUDAD, *ăh-oo'-dad*, popular name of Ammotragus tragelelaphus, one of the large-horned sheep of California. It is distinguished from the other "Bighorns," by the heavy mane which commences at the throat, and falls to the knees. This appendage is much smaller in the female than in the male. The aoudad is known by several names, such as the bearded sheep, the jaela, the fichtall, and the mouflon a mauchettes. The colour is pale dun. It is a large and handsome animal, being about three feet in height at the shoulder, and it is nearly as sure-footed as the chamois, this property being needed in the rocky localities which it frequents. It has been brought to England, where it has thriven well, a whole family having resided in the Zoological Gardens. The male was a very bad-tempered animal, charging fiercely at any one who entered his enclosure.

APALODERMA, *ăp-al-o-der'-ma*, a genus of birds belonging to the family Trogonidæ. (*See* TROGONS.)

APE, *aip*, a group of quadrumanous (four-handed) mammalia, a class of animals which, commonly speaking, are divided into four sections:—*Apes*, or such as are destitute of a tail; *baboons*, or such as have muscular bodies, elongated muzzles, and whose tails are usually short; *monkeys*, whose tails are in general long; and *sapajous*, or monkeys with prehensile tails, which can at pleasure be twisted round any object. (*See* MONKEY.) According, however, to the scientific zoological definition, the group ape comprehends only those four-handed mammals whose teeth are similar, both in number and form, to man's, and which have neither tails nor cheek-pouches. The worship of apes and monkeys has been common among pagan nations from a period of remote antiquity, and still prevails in Japan and India, and certain parts of Africa. An ape's tooth, kept in a temple at Ceylon, was regarded with peculiar reverence, and immense wealth was accumulated through the continual offerings of the worshippers; but the temple was plundered and the tooth carried away by the Portuguese, in 1554. (For a notice of the most remarkable apes, *see* GORILLA, ORANG-OUTANG, CHIMPANZEE, &c.; for an account of species, &c., *see* SIMIADÆ, QUADRUMANA.)

APE-SEA.—A popular name for the thresher shark, *alopias vulpes.* It is also called the fox shark.

APHANIPTERA, *ăf-an-'ip-terra*, an order of insects, in which the wings are reduced to four minute scales. The fleas belongs to this family.

APHIDÆ, *ăf'-i-de*, (Gr. *aphis*, a vine-fretter.) —These creatures, commonly known as plant-lice, live by sucking the juices of plants, upon which they may be seen congregated in immense numbers. When attacked, the plant grows sickly, the leaves curl up, and the fruit of the plant, if not utterly destroyed, is certain to be seriously impaired. The cultivation of hops is notoriously an uncertain business, and this uncertainty may in great measure be attributed to the prevalence of the hop-fly (*Aphis Humuli.*) So great are their devastations in some seasons, that the amount of duty paid upon hops has varied from £15,000 to £460,000; indicating, of course, a proportional variation in the crop. There is an aphis that particularly affects turnips and cabbages, and one (*Aphis vastator*) that has earned for itself a world-wide fame,—though it is doubtful if it ever deserved it,—as a blighter of potatoes. Most of the aphidæ are green; but that which attacks the bean (*Aphis Fabæ*) is black. They have a proboscis, by which they pierce and suck plants, and, at the extremity of the abdomen, two horn-like spines, from which exudes a saccharine fluid called *honey-dew*. The legs of aphides are long, and they move very slowly. Some are winged, and some are wingless, without distinction of sex. "Their manner of propagation is very curious. In the autumn, male and female insects are found furnished with perfect generative organs, and the females lay eggs, which are hatched in the following spring. But, instead of producing insects of both sexes, these eggs give birth only to females, which, in their turn, produce living young without any congress with the male. The brood thus brought forth again produces young in the same manner; and this goes on throughout the whole summer, without the appearance of a single male insect."—*Ref.* Dallas's *Animal Kingdom.*

APHRODITE. (*See* SEA-MOUSE.)

APIS, *ai'-pis.*—The Bee. (*See* BEES.)

APHROPHORA, *ăf-rof'-or-a*, a genus of homopterous insects, which in their larval condition are popularly called "cuckoo-spit," and in their perfect state "frog-hoppers." They are very injurious to garden plants and shrubs.

APLUSTRUM, *ăi-plus'-trum*, a genus of marine molluscs belonging to the bulla or bubble shells.

APLYSIA, *a-plis'-si-a*, a genus of marine molluscs, popularly called sea hares. The shell is wanting or invisible. They eject a deeply-coloured fluid, which is thought to destroy the hair, and which stains the skin of a dark violet.

A'PODIDÆ, *ăp-od'-idæ*, a family of entomostracous crustacea belonging to the branchiophods. All their feet, one hundred and twenty in number, are transformed into organs of respiration.

APORRHAIS, *ăp-o-rhay'*, *is* a genus of marine molluscs belonging to the family of Cerithiadæ. The "Pelican's foot" still belongs to this genus.

APPLE-MOTH (*Carpocapsa pomonella*), one of the most destructive enemies of the apple crop in this country. It lays its eggs in the eyes of the newly-formed fruit, within which the larva feeds. The result is the premature falling of the apple.

APRASIA, *ăp-ray'-si-ah*, a genus of limbless lizards inhabiting Western Australia. The body is covered on the back and sides with hexagonal scales.

APTERYX, *ăp'-te-rix*, (Gr. *a*, without, *pterux*, wing,) a gen. of birds allied to the ostrich and emu. It is remarkable for the enormous size of the eggs which it lays, each egg being equal to a fourth of the weight of the bird. It is becoming very rare, and will probably be extinct at no very distant period. A female has lived at the Zoological Gardens for twelve years. It has a long spike-like bill, of which it makes use in supporting itself when at rest. Its wings are simple rudiments,—mere stumps terminated by a hook. Its feathers fall loosely, like those of the emu. Only one species is known, about the size of a goose, a native of New Zealand. The name *kiwi-kiwi* is given it by the natives, who use its skin in making clothing. It is a nocturnal bird, hiding itself with exceeding care throughout the hours of daylight. The chiefs are in the habit of hunting the apteryx for the purpose of securing its skin, with which they make mantles of such value that scarcely any sum will induce the possessor

to part with them. The long and powerful legs of the bird show that it can run fast and kick violently; and if it is chased, it makes for its home with such speed that it cannot easily be caught. It lives in holes and clefts under trees, or amid the long ferns of New Zealand.

AQUARIUM, *ai-quair'-i-um*, a vessel containing water, either salt or fresh, in which living specimens of aquatic animals and plants are maintained in a healthy state. The words *vivarium* and *aquavivarium* have been employed by certain writers to denote the same thing. Aquaria, both fresh-water and marine, have become exceedingly common, and numerous works have been written on their management. As many of these treatises are utterly untrustworthy, having been compiled in haste, by men knowing little or nothing of the habits of the creatures adapted for aquaria, a few practical directions for stocking and keeping up these pleasing and instructive arrangements will doubtless be acceptable to many readers of this work. Before entering into practical details, we will briefly sketch the history of the aquarium, and describe the principles upon which it depends. To Mr Warrington must be awarded the thanks of all lovers of nature, for having first produced a perfect aquarium. In 1850 this gentleman communicated to the Chemical Society the result of a year's experiments "On the adjustment of the relations between the animal and vegetable kingdoms by which the vital functions of both are permanently maintained." To illustrate this adjustment, Mr Warrington kept for many months, in a vase of unchanged water, two small goldfish and a plant of *Valisneria spiralis*; and afterwards he made a similar experiment with sea-water, weeds, and anemones, which was equally successful. Before this, several attempts had been made to preserve fresh-water and marine organisms by naturalists. Mr Ward, whose ingenious discovery of the method of growing ferns and other delicate plants in closed cases (*see* WARDIAN CASE) had already earned for him a world-wide reputation, stated, as early as June 1849, at a meeting of the British Association, that he had succeeded not only in growing seaweeds in sea-water, but in sea-water artificially made. Seven years earlier, Dr Johnston succeeded in preserving the delicate pink coralline in a living state for eight weeks, in unchanged sea water. The list of workers in the aquarium cause would be incomplete without the name of Mrs Thynne, a lady living in London, who frequently surprised the scientific societies by exhibiting beautiful specimens of rare marine animals which she had kept for many months, having merely adopted the simple expedient of aërating the sea-water, by pouring it from one vessel into another. Before Mr Warrington published his paper, Dr Lankester had kept sticklebacks, gold-fish, and other fresh-water animals, in jars containing growing sprigs of *Valisneria*. Mr Gosse, the well-known marine zoologist, also laboured in the same field, and his efforts to domesticate his favourite sea-anemones were tolerably successful. The fact of his being ignorant of Mr Warrington's experiments proves that science had already smoothed the way to the discovery of that beautiful contrivance now universally known as the aquarium, by the aid of which the naturalist, sitting in his parlour or conservatory, may study the natural habits of the strange and interesting inhabitants of the deep.

The great principle involved in the aquarium is the constant interchange of elements between the animal and vegetable kingdoms. (*See* Animal Kingdom.) Water has the power of absorbing certain quantities of atmospheric air and other gases. In every natural water, whether fresh or salt, we find a proportion of carbonic acid, which is a compound formed of oxygen and carbon. The leaves of plants, when acted upon by light, decompose this gas, and, having no necessity for oxygen, they merely absorb the carbon. Animals, on the other hand, require oxygen, for the purpose of removing the waste carbon of their bodies ; and the process of respiration causes the two elements to combine in the form of carbonic acid. The vegetable world is therefore continually absorbing carbon, while the animal world is giving it off; and a balance is thus preserved between the two great divisions of organised beings. The other elements which enter into the composition of animal and vegetable structures circulate in a more obscure manner, but with equal regularity. A vessel containing a supply of aquatic plants and animals must be looked upon as a little world, in which the interchange of elements represents those vast phenomena that preserve the balance of life in the great world ; the few water-weeds take the place of the vast forests, the green prairies, and the dense jungles ; and the gold-fish, minnows, newts, and snails, stand for the earth's fauna. To form an aquarium, we have merely to imitate nature. A good supply of plants must be planted, to decompose the poisonous carbonic acid gas, and keep up a continuous supply of the vivifying oxygen ; while particular care must be taken not to overcrowd the tank with animals.

The vessels used for aquaria are constructed either wholly or partly of glass ; a common propagating glass, such as is used by gardeners, is often employed. These glasses can now be obtained, fitted with proper stands, and manufactured from a clearer kind of glass than formerly. Glass tanks, of a rectangular form, are, however, preferable to vases, as they do not distort the objects seen through their sides, and are less liable to breakage. The glass vase is extremely fragile, and an unlucky blow ruins it at once, and, perhaps, destroys the labour of many weeks ; whereas, a cracked side in a rectangular tank can be easily replaced. The most perfect form of tank is that invented by Mr W. Alford Lloyd, and known as the "slope-back tank." One side only of this tank is formed of glass, the other three being composed of slate. The back slopes downwards, from the source of illumination to the lower edge of the glass front, an arrangement which enables objects to be seen in a slanting light, which exhibits their form and colour to the greatest advantage. Whatever kind of tank is used, it should be provided with a cover of sheet-glass, to keep out dust, and to prevent the more adventurous creatures making their escape. A layer of well-washed shingle or sand is laid at the bottom of the aquarium, and in this the roots of such plants as are provided with these organs are imbedded. A few irregular blocks of stone, placed upon the shingle, look much better than any fantastic minarets of sham rock-work, formed of cement, and afford sufficient shelter for all animals of a retiring disposition.

The *fresh-water aquarium* is filled with ordinary river or spring water, and serves to exhibit the animals and plants found in ponds and ditches. The best and most lasting plant is the spiral Valisneria, (*Valisneria spiralis,*) which is a fine grassy-looking weed, having perennial roots. Its long green leaves rapidly decompose the carbonic acid in the water, and consequently make it a capital purifier. The American water-weed (*Anacharis alsinastrum*) is another good aquarium plant, but it must be frequently thinned, as it grows extremely fast. The different species of Duckweed (*Lemna*) and Pondweed (*Potomogeton*) are all applicable to the purposes of the aquarium naturalist. No animals should be introduced into the tank until the plants have been established sufficiently long (say three or four days) to properly aërate the water. Of the animals suited for the fresh-water tank, fishes rank first. All the different kinds of Carp, including the gold-fish, are easily domesticated. The Tench, the Miller's-thumb, the Minnow, the Stickleback, and the Grig Eel, are also suitable fish. The interesting class of Batrachia are generally represented by the common frog, the smooth newt, and the crested triton. Small water-tortoises and salamanders have lately been imported for aquaria. Some members of the class *Mollusca* are absolutely indispensable in a fresh-water aquarium as they act as scavengers, and carefully remove the green film which forms upon the glass, and which, in their absence, would soon obscure the contents of the tank. The best molluscs are the pretty coil-shells, (*Planorbis corneus* and *carinatus,*) the marsh-shell, (*Paludina vivipara,*) and the eared mud-shell, (*Limnea auricularis.*) It is doubtful whether insects ought to be admitted into aquaria which are intended merely for parlour ornaments ; but the naturalist ought not to consider his tank complete unless the important class of insects is properly represented. Considerable care, however, must be bestowed on the selection, as some of the members of the beetle tribe are so bloodthirsty that they will even venture to attack the smaller fish. Some writers on the aquarium recommend artificial aëration ; but when the balance of vegetable and animal life is properly adjusted, there is no necessity for resorting to any extraordinary means to insure a copious supply of oxygen.

The *Marine Aquarium* affords us the means of observing some of the most curious forms of animal life. The tank is filled with sea-water, which should be conveyed to its destination in clean stone jars, or in casks perfectly seasoned. When real sea-water cannot be got at, (though this emergency must now be a very rare one,) *artificial sea-water* may be used, after having been prepared for the reception of animals by growing marine plants in it. Mr Gosse has given the following simple formula for the preparation of this artificial sea-water :—

Common table-salt,..........	3½ ounces.
Epsom salts,....................	¼ ounce.
Chloride of magnesium,...	200 grains troy.
Chloride of potassium,.....	40 ,,

These materials are to be added to a little less than four quarts of water. The specific gravity of the solution, when properly prepared, will be found to be 1·026. The green and red seaweeds are the plants used, the dark-coloured weeds being inapplicable for aquarium purposes. (*See* Algæ.) The animals which form the glory of the marine tank are the sea-anemones (*see* Anemones) and madrepores. Besides these, the star-fishes, the sea-urchins, the barnacles, and the beautiful plumed worms called serpulæ and sabellæ, generally gain admission. The crab family furnish the humorous element in the aquarium; and it is impossible to observe the clumsy antics of some of them, particularly the hermits, with a serious countenance. The free swimmers are shrimps, prawns, and certain small fishes; but, as few of these can be preserved for long in the aquarium, they are generally omitted altogether. The scavengers of the marine tank are the periwinkles, cockles, whelks, limpets, and tops. In the marine aquarium it is particularly necessary to guard against overcrowding. Every animal requires a certain amount of room, a certain amount of air, and a certain amount of solid nourishment; therefore we cannot exceed these natural limits without injury to our whole stock. Artificial aëration may be resorted to with some show of reason, as it is only imitating what is constantly taking place in the ocean. The waves, the rising and falling of the tide, and the action of the wind, all help to supply the creatures of the deep with the life-supporting element; and we may, therefore, mimic these grand mechanical agents by blowing air into our tank, or allowing a quantity of water to drip into it from a considerable height; but it is far better to keep the number of our animals within moderate limits, and to trust to the algæ for a proper amount of oxygen. Sometimes the water in an aquarium will suddenly become turbid from no easily-explained cause; and it will be found necessary to remove the animals to a temporary vessel, and to filter the water through sponge or powdered charcoal. Mr Lloyd discovered that the opacity of the water could be destroyed by placing it in a dark closet.—*Ref.* Gosse's *Aquarium;* Lankester's *Aquavivarium;* Lloyd's *Practical Instructions for Tank Management.*

Aquila, *ăk'-wil-la*, a gen. of predaceous birds commonly known as eagles, *q.v.*

Ara, *ah'-rah*, a gen. of birds belonging to the family Psittacidæ, and popularly known as macaws, *q.v.*

Arachnida, *ă rack'-nid-ah*, a class of invertebrated animals, which comprises the scorpions, spiders, and mites. They have no antennæ, and have four pairs of legs.

Araguato, *ă-ra-gwâ'-to*, popular native name for the great howler monkey of South America, *q.v.*

Araramboya, *ah-rah-râm-boy'-yah*, a snake of Southern America, allied to the boa constrictor. Its colour is green. It is also called the bojobi, and the dog-headed boa.

Arapunga, *ah-ra-pun'-gah*, a gen. of birds belonging to the family Ampelidæ or chatterers. The bell-bird or campanero of South America is an example of this genus. (*See* Campanero.)

Archer-Fish, *ar'-cher fish*, a curious little fish inhabiting the Chinese seas. Lurking near the surface of the water, it awaits the approach of an insect, and then suddenly squirts at it a drop of water, which infallibly brings it down. It is about seven inches long, and has a wide mouth, with the lower jaw considerably prolonged. The Chinese keep these fishes in jars, and amuse themselves by watching the effect of suspending a fly above a jar with a thread. Its scientific name is Toxo'tes jacula'tor, and its colour is green, banded with brown.

Archibuteo, *ark-ĭ-bew'-te-o*, a gen. of birds belonging to the Falconidæ, and comprising some of the buzzards.

Arctia. (*See* Tiger-Moth.)

Arctic Fox. (*See* Fox.)

Arctomys, *ark'-to-mis*, a gen. of rodents, popularly known as Marmots, *q.v.*

Arctopsis, *ark-to'p-sis*, a gen. of crustacea belonging to the spider crabs. Specimens of this genus are found in England.

Ardea. (*See* Heron.)

Argala. (*See* Adjutant.)

Argali, *ar'-ga-li* (*Caprovis Argali*), in Zool., a species of wild sheep inhabiting the mountains of Siberia, Kamschatka, and the higher regions of the Himalayas. Dr Hooker, in his *Himalayan Journal*, thus describes the animal:—"We came suddenly upon a flock of gigantic wild sheep feeding on scanty tufts of dried sedge and grass; there were twenty-five of these enormous animals, of whose dimensions the term sheep gives no idea; they are very long-legged, stand as high as a calf, and have immense horns, so large that the fox is said to take up his abode in their hollows when detached and bleaching on the barren mountains of Thibet." The horns of the male of this species of wild sheep are about 4 feet in length and 14 inches in circumference at their triangular-shaped base. The name of the animal is Mongolian. The Rocky-Mountain sheep, or Big-horn, has also been termed the American Argali. (*See* Sheep.) These large-horned sheep are popularly grouped under the name of Mouflons.

Argentine, *a'r-jent-een*, a little fish allied to the trout and salmon, and very useful for bait. It belongs to the genus Scopelus.

Argonauta. (*See* Paper-Nautilus.)

Argulus, *ăr'-gul-us*, a gen. of parasitic entamostraca. The argulus is flat like a leaf, and is very common on the perch, the stickleback, and the roach.

Argus Pheasant, *ar'-gus* (*Argus giganteus,*) a rare and beautiful bird, native of many parts of the Indian islands. The adult male measures between five and six feet from the beak to the extremity of the tail, and the plumage is wonderfully varied and elegant.

Argus, Shetland. (*See* Astrophyton)

Ariel, *ă'-ri-el*, one of the Flying Marsupials of Australia, belonging to the genus Petaurus. It is generally found near Port Essington.

Arkys, *ăr'kis*, a gen. of Brazilian spiders. The abdomen is heart-shaped, and the colours are bright orange and golden yellow.

Armadillo, *ar-ma-dil'-lo* (*Dasypus*), a gen. of mammiferous quadrupeds, intermediate between the sloths and ant-eaters, and characterised by the possession of molar teeth only. Instead of hair, the armadillos are covered with a species of hard bony crust, forming three bucklers, on the rump, shoulder, and head, respectively; the latter being connected by a number of transverse movable bands, very similar in form and appearance to the plate-armour of the middle ages, from which, indeed, these animals have acquired their name of armadillos,—a name of Spanish origin, and adopted by English writers. The anterior surface of the body not covered by the buckler, is clothed with coarse scattered hairs, of which some are also seen to issue forth between the joints of the armour. It has rather a pointed snout, long ears, short and thick limbs, and stout claws, which are in every respect adapted for digging and burrowing. So rapid, indeed, do the armadillos perform this operation, that they easily bury themselves in the earth beyond the reach of the hunter, who has no other resource but to smoke out his obstinate game. Once brought to the surface, however, the animal becomes an easy prey, as its only defence is to roll itself up hedgehog-wise, and await an assault. They are, however, by no means easily unkennelled, and have been known to allow a hunter to hack their tails off, while they held on in the depths of their burrow by their powerful claws. The animal never attempts to bite any one by whom it is attacked. Its food consists of roots, fallen fruits, and worms. Azara informs us that where armadillos abound, ants are sure to be scarce, as the animals break into the ant-hills and devour the insects as greedily as the ant-eater itself. It will not reject carrion, and has no scruples about violating a human grave, should an opportunity occur. The tropical and temperate regions of South America are the original and proper habitat of all the known species of the armadillo. The largest species is the Tatouay, or giant armadillo, an animal measuring four feet six inches in length; and one of the smallest species is the Pichey, which is only fourteen inches long, including the tail.

ARMADILLO, (*in Crustacea*,) a group of Isopods, which are able to roll themselves into a globular shape, and are popularly called pill woodlice.

ARNEE, *Ar-ne'* (*Bos Arne*,) an inhabitant of the highlands of Hindostan, closely allied to the common wild buffalo. It is remarkable for strength and courage, qualities admirably seconded by a pair of horns measuring from four to six feet in length, and arching in the form of a bold crescent. In Bengal this animal is known as *Arria*.

ARTAMUS, *ar'-ta-mus*, a genus of birds belonging to the Ampelidæ or chatterers. The wood-swallow of Australia sometimes called the sordid thrush, is a good example of this genus.

ARTERY, *ar'-te-re*, (Gr. *aer*, air, and *tereo*, I keep,) is literally an air-duct, and was a name applied by the ancients to certain vessels of the human body, which were believed by them to contain air, from their being found empty after death. The arteries are those vessels which convey the blood from the heart to all parts of the system. They are membraneous cylindrical tubes, composed of three coats; viz., the external, which is firm, strong, and elastic; the middle, which is muscular, contractile, and brittle; and the internal, which is brittle, smooth, and transparent, and lined with epithelium on the side washed by the blood. The action of the arteries called the pulse corresponds with that of the heart, and is effected by the contraction of their muscular coat and the great elasticity of their outermost one. Besides the arteries which carry the purified blood from the heart to all parts of the body, there is the pulmonary artery, which emerges from the right ventricle of the heart, and carries the impure blood from the heart to the lungs. The other arteries all spring from the aorta. (*See* ANATOMY.) The principal arteries will be found noticed under their respective names.

ARTHRONOMALUS, *ăr-throw-nom'-al-us*, a genus of centipedes remarkable for their luminous properties. The common luminous centipede of England belongs to this genus.

ARTICULATA, or ARTICULATED ANIMALS, *ar-tik-u-lai'-ta*, (Lat. *articulatus*, jointed), according to the classification of Cuvier, the third great division of the animal kingdom. The great French naturalist subdivided the *Articulata* into four classes, to which later writers have added four others. The first four of the following classes are those of Cuvier:—1. Annelida, as leeches, earthworms, &c.; 2. Crustacea, as lobsters, crabs, prawns, &c.; 3. Arachnida, as spiders, mites, scorpions, &c.; 4. Insecta, as butterflies, beetles, flies, &c.; 5. Myriopoda, as centipedes; 6. Cirrhopoda, as barnacles and sea-acorns; 7. Rotifera, wheel-shaped animalcules, aquatic; 8. Entozoa, lowest of the worms, parasites upon or within other animals. (*See* these words.) The *Articulata* derive their names from the fact of their being composed of segments articulated or jointed together, each segment being formed of one or more rings.

ARTICULATION, in Anat., is applied to the connexion of the bones of the skeleton by joints. (*See* ANATOMY.)

ASCARIDES, *ăs-kăr'-i-dees*, (Gr. *askarizo*, I jump,) parasitic worms which inhabit the intestines of animals. They belong to the group *Entozoa*. One of the commonest species, the *A. lumbricoides*, which is very like the common earthworm, is found frequently in the intestines of men, and of horses, oxen, &c. They have been observed fifteen inches in length, and they are often the cause of severe disease, which has sometimes proved fatal. The mouth of this worm is only formed for suction; hence it is unable to injure the coating of healthy intestines. In a very young state, ascarides have never been found either in man or the other animals. Persons living in damp valleys are said to be most liable to suffer from them. The *A. vermicularis*, or thread-worm, is very common among young children. It is white, and about half an inch long. It infests the lower part of the intestines in great numbers. (*See* VERMIFUGE, THREADWORM.)

ASCIDIANS, *ăs-sid'-i-ans*, a term usually employed to distinguish a genus of molluscan animals found in all seas, and belonging to Cuvier's order *Acephala*, without shells. They have two orifices, by means of which they breathe and feed: one is branchial, the other anal. They are encased in a soft leathery tunic, enclosing a second mantle or tunic, which is muscular, and adheres to the first only near the orifices. Their nature is very apathetic, and they remain fixed to a rock or a piece of seaweed, living upon the animalculæ which are drawn in with the water that is constantly passing through their ciliated respiratory organs. The action of the *cilia* seems to be involuntary. The sexes of ascidians are distinct; and their chief nervous centre is situated between the openings of the muscular tunic. In 1828, MM. Milne-Edwards and Audouin discovered that an ascidian does not begin life as a fixed animal, but is able to move about like the tadpole, by means of a vibrating tail. After a time it attaches itself to a plant or rock, and the tail disappears. Many of the ascidians are splendidly coloured, and often cling about seaweed like bunches of strange fruit. They are divided into two classes,—compound and solitary ascidians.

Asellus, *ai-sel'-lus,* a genus of sessile eyed crustacea, allied to the common woodlouse. The asellus is popularly called the great sea slater, and is very plentiful on sea-side rocks and among shingle. It seldom ventures into the open air by day, but at night may be seen in great numbers. Sometimes it is called the water hog-louse.

Ashkoko, *ash-ko'-ko,* native name for the Syrian hyrax.

Asilius, *ai-sil'-li-us,* a genus of dipterous insects, popularly called harvest-flies. They are large and fierce, chasing other flies and sucking their juices through their powerful proboscis.

Asinus, *as'-in-us,* a genus of mammalia belonging to the family equidæ and the order ungulata. The neck is maned, and the tail has a tuft of hair at the extremity. The asses, quaggas, and zebras belong to this genus. (*See* Ass.)

Asp, *asp,* (Lat. *aspis,*) a name confined by naturalists to the *Vipera aspis,* a venomous snake, peculiar to the European Alps, but commonly applied to several species of poisonous serpents. The asp is often mentioned by both Greek and Roman writers; but the most common and celebrated would seem to be that called by the Arabs Haje Nascher. This animal measures from three to five feet in length, and is of a dark green colour, marked obliquely with bands of brown. The haje is closely allied to the cobra capelo, or spectacled snake of India. Forskoel, a Swedish naturalist, who has written on the animals of Egypt, tells us that the jugglers of Grand Cairo have the art of taming the haje, taking care, however, to deprive it of its poisoned fangs, though even then they avoid its bite when irritated. The habit which this serpent has of erecting itself when approached, made the ancient Egyptians imagine that it guarded the places it inhabited, and accordingly they have represented it on their temples sculptured on each side of a globe.

Aspergillum, *ăs-per-gil'-lum,* a genus of marine molluscs belonging to the family Gastrochænidæ. The shell is very long and nearly cylindrical, but expands at the end into a round perforated disc very like the "rose" of a watering pot. In consequence of this structure it is popularly called the watering-pot-shell.

Aspidomorpha, *ăs-pid-o-mor'-fah,* a genus of Coleoptera, remarkable for being the largest of the cassididæ or tortoise beetles.

Aspidura, *ăs-pi-du'-ra,* Gr. *aspis,* shield, *oura,* tail,) in Geol., a genus of fossil star-fishes, so named from the buckler-like arrangement of the bony plates which protect the arms. They are peculiar to the muschelkalk of Germany, and are closely related to the existing ophiura.

Ass, *ass,* (Lat. *asinus;* Fr *âne,* for *asne*· Ital. *asino,*) (*Equus asinus,*) an animal too well known, at least in a domestic state, to need description here. It is found wild in the same parts of Asia as the horse, and it is here that we find it make the best figure in a state of domestication. In these countries it would seem that the ass was tamed before the horse; and to this day, in the East, asses are far more generally used as beasts of burden and draught than horses. There, however, instead of being despised and neglected, care is taken to cultivate the breed, by crossing the finest specimens. Even the wild ass is procured for this purpose. "The asses of Arabia," says Chardin, "are, perhaps, the handsomest animals in the world. Their coat is smooth and clean; they carry the head elevated, and have fine and well-formed legs, which they throw out gracefully in walking or running. They are used only for the saddle, and are imported in vast numbers into Persia, where they are frequently sold for 400 livres, and, being taught a kind of easy ambling pace, are richly caparisoned, and used only by the rich and luxurious nobles." The ass is, properly speaking, a mountain animal. Its hoofs are long, and furnished with an extremely hard rim, leaving a hollow in the centre, by which means he is enabled to tread with more security on the slippery sides of hills and craggy places. Its most general colour is mouse-colour, with a blackish stripe extending along the spine to the tail, and crossed by a similar stripe over the shoulders. The female goes with young eleven months, and seldom produces more than one foal at a time.

Ass, Wild. (*See* Dziggueтai.)

Asse. (*See* Caama.)

Assimilation, *ăs-sim-i-lai'-shon,* (Lat. *adsimilatio,* from *ad,* to, and *similis,* like,) the act or organised bodies, by which they convert foreign substances into their own proper substance, *e.g.,* as food is converted into nutriment. (*See* Nutrition.)

Assapan, *ăs'-sa-pan,* popular name of a flying squirrel of America. Its scientific name is *Sciuropterus volucella.*

Astacus, *ăs'-tak-us,* a genus of stalk-eyed crustacea, of which the common river crayfish is a good example. It is allied to the lobster.

Asterias, *ăs-tee'-ri-as,* a genus of star-fishes, very plentiful in the British seas.

Astragalus, *ăs-trag'-a-lus,* (Gr. *astragalos,* a die,) in Anat., is the name of the ankle-bone, or first bone of the foot, upon which the tibia moves. It is so called from being shaped like the die used by the ancients in their games.

Astrea, *ăs-tree'-ah,* a genus of Madrepores, in which the radiated animals are scattered at intervals, so as to bear a fanciful resemblance to the stars. Both recent and fossil examples are common.

Astrophyton, *ăs-tro-fy'-ton,* a genus of star-fishes in which the arms divide and sub-divide continuously, until they are some eighty thousand in number. The animal can roll itself up into a nearly globular form, so as to resemble a basket, and is sometimes called the basket urchin or sea basket. A name of one well-known species is the Shetland argus. It secures its food by enclosing it in the basket-like arms.

Astur, *as'-tur,* a genus of birds of the family

Falconidæ, and found throughout the world. The goshawk belongs to this genus.

Aswail.—Native name of the sloth bear of India. (*See* Bear.)

Atagen, *ăt'-a-jen*, a genus of pelicans found only in the tropics. The frigate bird belongs to this genus.

Ateles, *ăt'-e-lees*, (Gr. incomplete,) in Zool., a genus of American monkeys, of that division of the Quadrumana termed *Sapajous*. The most distinctive characters of the genus are, long, slender, but powerful prehensile tails; forehands almost entirely without thumbs, or possessing only the merest rudiment of the organ,—whence the name of the genus; a dental system which, in common with all the American Quadrumana, consists of two molar teeth more than are possessed either by man or by corresponding genera in the Old World. Other prominent characters of the ateles are round small heads, limbs remarkably long and slender, corpulent bodies. These characteristics have obtained for the genus the name of spider-monkeys. Possessing neither cheek-pouches nor callosities, they are, in these respects, nearly allied to the real apes. Their entire physical conformation fits them for an exclusively arboreal life. Their mode of locomotion upon the earth is slow, awkward, and uncertain. Sometimes they crawl along in a vacillating fashion, by using their long fore-arms as crutches; sometimes they urge themselves forward by poising themselves upon their hind-legs, and making use of their long arms and tail as a means of balancing themselves in this, to them, unusual position. Naturalists and travellers relate many wonderful stories of their docility, intelligence, and affectionate disposition. Unlike the common monkey, they are grave even to melancholy, are neither fickle nor mischievous, and, in a domesticated state, are capable of exhibiting the strongest attachment towards a kind owner. Acosta, in his "History of the West Indies," gives the following anecdote of a quata, one of the species of the genus; he says, "They sent the quata to the tavern for wine, putting the pot in one hand and the money in the other. They could not possibly get the money out of his hand before his pot of wine was full. If any children met him in the street, and threw stones at him, he would put his pot down and cast stones among the children, till he had assured his way. Then would he return to carry home his pot; and, what is more, although he was a good bibber of wine, yet he would never touch it till leave was given him." The genus *Ateles* comprehends the following species:—1. *Ateles paniscus*, or quata; 2. *Ateles marginatus*, or chuva; 3. *Ateles ater*, or cayou; 4. *Ateles Belzebub*, or marimonda; 5. *Ateles melanocheir*; 6. *Ateles arachnoides*, or brown quata; 7. *Ateles hypoxanthus*, the mono or miriki; 8. *Ateles subpentadactylus*, or chameck.

Ateuchus. (*See* Beetle and Scarabæus.)

Athanas, *ăth'-an-as*, a genus of shrimps, remarkable for the very large forceps. Montague's shrimp belongs to this genus.

Athene, *ăth-ee'-ne*, a genus of owls inhabiting the warm parts of both hemispheres. The burrowing owl of North America is one example of the genus.

Atherine, *ăth'-e-reen*, (Lat. *atherina*,) a gen. of fishes, formerly classed with the Mullet family, but now separated from them. They rarely exceed six inches in length, and have a rather flat upper jaw. Some possess very small teeth, while others are entirely toothless. All the known species have a silvery stripe on each side of the body. In the Mediterranean they are very numerous, and they also abound in the southern coast of England; upon the eastern coast of England, as well as in certain parts of Ireland, they are also to be met with. At Brighton the atherine is called the sand-smelt; and in several market-towns of England where the smelt is unknown, the atherine is commonly sold under that name.

Atherura, *ăth-er-u'-ra*, a genus of porcupines inhabiting Africa, India, and Molocca. The tufted-tailed porcupine belongs to this genus.

Atlas, in Anat., is the name of the first vertebra, so called either from the Greek verb *atlao*, I sustain, or from Atlas, who was fabled to support the world upon his shoulders. It differs from the other vertebræ in having its body small and thin, and its foramen very large, being in form somewhat like a ring. It is connected above with the condyles of the occipital bone, and receives the tooth-like process of the second cervical vertebra from below, the former admitting of moving the head up and down, the latter from side to side.

Atlas Beetle, a magnificent insect from the Philippines and part of India. It is allied to the scarabæus and the stag beetle. The length is about three inches, and the colour is brilliant olive green. The scientific name is Chalcosoma Atlas.

Atracaspis, *ai-trak-as'-pis*, a genus of venomous serpents remarkable for the great length of the poison-fangs, which are so long that the reptile cannot open its mouth wide enough to use them for attack. It is seldom more than two feet in length.

Attacus, *ăt'-tăk-us*, a genus of moths belonging to the Bombycidæ, the family to which the silkworm belongs. The ailanthus silkworm, which produces a very strong and glossy fibre, belongs to this genus. It is called the ailanthus, because it feeds on the tree of that name.

Atticora, *ăt-tick'-o-rah*, a genus of swallows inhabiting the hotter parts of the world. Example, the white-breasted swallow, or boodee-boodee of Australia.

Atun, *ai'-tun*, a fish that is found in the African and Australian seas, and is extremely valuable for the delicacy of its flesh. It belongs to the genus Thyrsites.

Atypus, *ai-ty'-pus*, a genus of spiders allied to the great crab spiders of the tropics. It is remarkable for the enormous development of the mandibles, and the "watch-tower" on which the eyes are perched, so as to enable the creature to see objects in front. It lives in a bower lined with silk. One species has been found in England, but is very rare.

Auk, Great, *awk*, (*Alca impennis*.)—Although this bird has occasionally been met with on the British coast, the northern latitudes are more congenial to its habits; and hence, owing to our limited acquaintance with the inhabitants of the Arctic regions, it is not very well known. In the collection of the British Museum there is a male specimen of this bird, which was sent to Mr Bullock during his tour in the Orkneys. This was one of a solitary pair seen in those regions; the female was killed a little time previous to Mr Bullock's arrival. That gentleman took part in a long chase of the male, but was unsuccessful; the auk, although pursued by a six-oared boat, making its way under water with remarkable celerity. The wings of the great auk are but partially developed. In length it measures about three feet, and its wings scarcely exceed four inches. Though the wings are almost useless for aërial locomotion, they are well adapted for assisting the bird's progress under water. How far north these birds may be found is not known: so far, however, as our Arctic explorers have penetrated, the great auk has always been seen. Its movements on land are somewhat awkward; and, indeed, it is altogether adapted for an aqueous existence. Except at the breeding season, it rarely visits the shore. While walking on *terra firma,* it keeps itself nearly in a vertical position. Their food consists of fish and crustacea, and other marine productions. The great auk is now believed to be extinct, not a living specimen having been seen for the last twenty years.

Auk, Little, (*Arctica Alle,*) is the most diminutive of the auk tribe, and the hardiest. The colder and wilder the region, there do they seem to congregate in larger flocks, and enjoy the inclement weather with as much relish as their human companions the Esquimaux. In the locality of Baffin's Bay they are found in large flocks; also at Melville Island. On the inhospitable wilds of Spitzbergen and Greenland thousands of these birds find a home. Here they watch for the breaking up of the ice, and then swarm down in myriads, and busily search for the crustacea in the fissures of the broken ice. It very rarely visits this country; indeed, those that have been seen are more probably storm-blown castaways than visitors in search of a home for the season. The little auk is a compact, stout bird, about nine inches in length. The upper parts of the plumage are mostly black, the cheeks and under-parts white, the legs yellowish-brown, the bill black. In summer the front of the neck, which during the winter is black, assumes a paler hue. It lays one egg, of a pale bluish-green, and, like the preceding, affects the highest cliffs.

Auk, Razor-billed, (*Alca torda,*) larger than the preceding; when full grown, it measures about fifteen inches in length and twenty-seven across the wings. This species is found also in the Arctic regions; but, unlike the great auk, is a frequenter of warmer climates, including the coasts of Great Britain, France, Holland, and Germany. These birds take up their abode on the highest cliffs attainable, and live together in large flocks, associating with the guillemots and kittewakes. About May the auk colonies begin their task of incubation, sitting closely together in rows, one above the other. It is very remarkable, that, although the razor-billed auk lays but one egg, and so many hundreds are accumulated on the cliffs at one time, without any kind of covering to denote their respective owners, no inconvenience is occasioned; every auk knows its own egg, and probably in no instance is the paternity of a young bird questionable. It has occasioned some wonder how the eggs of the auk are kept so secure on the small ledges on which they are laid; and it is remarked, that if a human hand were to remove one, the most delicate artifice would fail to replace it in so secure a position. The balancing powers of the auk are, however, considerably overrated; for it has been ascertained that the egg is attached to the spot by a glutinous substance, with which it is, when newly laid, covered. The razor-billed auk is very common in Scotland, and in the Hebrides are several breeding-places. "One of the most interesting is the little island of Berneray, called by mariners Barray Head, about ninety miles distant from the coast of Scotland on the one hand, and St Kilda on the other, and one of a group of islets named the South Isles of Barray." These breeding-places are of considerable extent. The foregoing authority makes mention of a precipice, "to the extent of half a mile, covered with these birds for the purpose of breeding. These birds inhabit the cliffs, not promiscuously, but with a degree of regularity and distinctness which seems not a little wonderful. On the grassy summits breed the puffins, burrowing in the turf. From thence to half-way down is the place selected by the auks; while in the remaining division are stationed the guillemots and kittewakes, the latter coming almost to high-water mark."—*Macgillivray.* The eggs of the razor-bill are extremely variable in colour, for in a collection of five hundred specimens, no two eggs are alike.

Aulacodus, *awl-a-co'-dus,* a genus of rodents, forming a link between the beaver and porcupine. It is a native of Southern Africa. The ground-pig of the country belongs to this genus.

Aurelia. (*See* Chrysalis.)

Auricles, *aw'-rikls,* in Anat., is the name given to two of the cavities of the heart. (*See* Heart.)

Auricula, *aw-rik'-u-la,* a plant-eating molluscous animal, comprehended in that class of Gastropods to which the common snail belongs. Its organs of respiration are formed for breathing air, but some have the power of living in water for a long time. It inhabits a shell somewhat oval in shape, and marked by wide plaits. The fancied or real resemblance of the shell to the ears of certain animals accounts for the animal's vulgar appellation of Midas' ear.

Aurochs, *aw'-rocks.* (*See* Bonassus.)

Automatic Actions, *aw-to-măt'-ik,* is a term applied in Psychol. to certain muscular movements which are influenced simply by sensation, and not at all by the will; as winking.

Aves. (*See* Birds.)

Avicula, *a-vik'-u-la,* a genus of marine conchifera, the shell of which is imported in considerable quantities, and used, under the name of mother-of-pearl, in the construction of buttons, knife-handles, &c. The real commercial value, however, of this peculiar oyster rests on the true pearls often found in its interior.

Aviculopecten, *a-vik'-u-lo-pek'-ten,* in Geol., a genus of fossil bivalve molluscs, peculiar to the carboniferous limestone, and often so well preserved that even the colours of the living shell are retained.

Avocet, or Avosetta, *ăv'-o-set,* (*Recurvirostra avocetta.*)—The chief peculiarity of this aquatic bird is the form of its bill. It is very thin, flexible, of a substance like whalebone, and turns hookwise, but in an opposite direction from the hawk and other tribes. The plumage of the avocet is black and white. Buffon makes the bird's bill a subject for lamentation on the blundering of Nature in so ill providing a creature with a means of sustenance. Mudie, however, takes a contrary and a proper view of the matter, and demonstrates that for scooping, probing, and beating the water, while the mandibles act as a strainer and retain the finny prey, the avocet's bill is most admirably adapted to its office. A few years ago, and in the fen-bird season, it was no uncommon thing to find the avocet in the London poultry-market; now, however, they are seldom, if ever, seen so cheaply exposed. On account of the peculiar shape of the beak, the avocet is sometimes called the Cobbler's-awl bird.

AXILLA, *ăx-il'-la*, (Lat.,) is applied in Anat. to that cavity under the upper part of the arm called the armpit. Hence the term Axillary is applied to the arteries, veins, glands, &c., of this part.

AXIS DEER, *ăx'-is*, (*Cervus axis*,) a deer peculiar to India. It is about the size of the fallow-deer; its ground-colour is pale red; a white line runs along its sides, dividing the under from the upper parts of the body, which is prettily spotted with white spots. Hunting the axis is a favourite sport, and its flesh is esteemed a great dainty.

AXIUS, *axe'-i-us*, a genus of shrimps, remarkable for their thick and powerful claws. The members of this genus burrow in the mud, and are so deliberate in their movements that they are popularly called Slow-Shrimps.

AXOLOTL, *ăx'-o-lotl*, (*Siren pisciformis*,) an amphibious animal, chiefly peculiar from possessing, at the same time and always, both gills and lungs, thus enabling it to breathe air and water, according to pleasure or exigence. It is about nine inches long; head broad and flat; the eyes situated near the muzzle; the tail nearly as long as the entire body, and compressed at the sides, like that of the common water-newt. It is of a uniform brown colour, thickly mottled with small black spots. The axolotl is very common in the lakes of Mexico, and, according to Humboldt, likewise inhabits the cold waters of mountain lakes at much greater elevation above the level of the sea than the plains surrounding that city. Dressed after the manner of stewed eels, it is sold commonly in the market-places of Mexico. It is thought by many naturalists to be the undeveloped larva of some batrachian yet unknown to science.

AYE-AYE, *ai-ai'*, (*Cheiromys madagascariensis*.)—This animal, in many accounts confounded with the *ai*, or sloth, has lately attracted much attention, and is now known to belong to the monkey tribe. When first discovered, it was supposed to be a species of squirrel. It lives in hollow trees, and is altogether a nocturnal animal. It has large flat, bat-like ears, and its tail is long and bushy. Each fore-hand has five fingers, the third being singularly attenuated, and provided with a strong claw. The hind-legs are also furnished with prehensile hands. The entire body is clothed with long smooth hair, of a jet black, among which some long white hairs are interspersed, beneath which is an under-coat of a woolly nature. It measures about three feet. The powerful teeth of the aye-aye enable it to bite deep into the wood, and to feed either upon the exuding sap, or upon the insects which have made their home in the branches. It takes liquid food by dipping the fourth finger, and then passing the wetted member between its lips. A female aye-aye is now living in the Zoological Gardens, where she has been for more than two years. A detailed account of this animal may be found in the *Boy's Own Magazine*, August 1863, p. 113.

B

BABOON, *bă-boon'*, (Fr. *babouin*,) (*Cynocephalus*,) a genus of Quadrumana, in which the tail is never long and often very short. When it is of moderate length, it projects horizontally for a few inches and then droops; when it is short, it is very perpendicular. The nose is prolonged uniformly with the jaws, and the nostrils open at the end of it, exactly as in the dog. Indeed, in shape of head, the resemblance the baboon bears to the dog is its chief distinctive peculiarity. It has a long and truncate muzzle, cheek-pouches, and sharp claws, and is certainly the fiercest and most repulsive of the Quadrumana. The common baboon (*Cynocephalus papio*) is a native of the coast of Guinea. It is of a uniform yellowish-brown colour, with a shade of light red on the head, shoulders, and extremities, the face, ears, and hands being naked, and entirely black. It is furnished with whiskers, which have a backward direction, but do not conceal the ears. The variegated baboon, or mandril, is the most remarkable of the genus. The head of this creature is grotesquely large, its face long; it possesses scarcely any forehead, and its snout is blunt and abrupt. The eyes, which are very small, are sunk deeply in the head, and the cheek-bones very prominent, and tinted with violet, purple, and scarlet. The hair rises above the forehead to a peak; and beneath the chin there is a small beard of orange-colour. Round the back of the neck the hair is long, and inclines forward. The hinder parts of the animal's body, commencing from the loins, are marked with a soft violet, which gradually expands to the most vivid red; and very singular does its little stumpy tail look, sticking bolt upright in its crimson setting. Many years ago a mandril was kept at Cross's menagerie, in London. "Happy Jerry" the brute was named; and it was taught to simulate a relish for tobacco and beer. This animal ever retained its natural ferocity with strangers, but was particularly sociable with its keepers. "Happy Jerry's" stuffed skin now adorns the British Museum. Besides the baboons mentioned, there are the gelada of Abyssinia, the chacma of the Cape of Good Hope, and others.

BABYROUSSA, *băb-i-roos'-sa*, (*Sus Babirussa*,) an animal of the hog genus, found in a wild state in India and the Indian islands. The animal's chief peculiarity is the possession of four protruding and curved tusks, turned upwards and backwards, so as very nearly to describe a semicircle. The tusks of the upper jaw pass through holes in the upper lip, and often attain so great a length, that they nearly touch the forehead. The object of this peculiar arrangement is not known, though some of the older naturalists gravely tell us that the use of the tusks is to afford the babyroussa an opportunity of hanging itself to any convenient projection, should it fancy a quiet nap. The same authorities, however, ascribe to the horns of the chamois the same use. The animal is still further distinguished from the common hog by its slender build and the fineness of the bristles that cover its body. It is said that, when closely pursued, the babyroussa will, without hesitation, take to the water, and, by alternately swimming and diving, speedily elude its enemy. Its food is vegetable, and its flesh, according to travellers, superior to dairy-raised pork.

BACK, *băk*, (Ang.-Sax.,) is that portion of the human body which extends from the neck to the loins, and includes the dorsal vertebræ, the posterior portions of the ribs, and the muscles and skin pertaining thereto. Pains in the back may proceed from a variety of causes; as rheumatism, an affection of the spine, disease of the kidneys, &c.

BACTERIA, *băk-tee'-ri-ah*, a genus of orthopterous insects, comprising the curious walking-stick insects, *q. v.*

BACULITE, *băk'-u-lite*, (Lat. *baculum*, a staff,) in Geol., a straight, many-chambered, conical shell, of the chalk epoch. In its internal structure it resembles the ammonite. From its prevalence in the chalk of Normandy, that rock has been termed the Baculite limestone.

BADGER, *bădj'-er*, (*Meles Taxus*,) a carnivorous quadruped, inhabiting most parts of Europe and Asia. The badger was classed by Linnæus among the bears, but very properly separated from that group by succeeding naturalists, and placed among the weasels. It is a slow and heavy animal, passing the day in sleep within its complicated burrow, and emerging at night in search of food, which consists indifferently of animal or vegetable matter. It is said sometimes to dig up wasps' nests; and Buffon, who mentions this habit, attributes it to the animal's fondness for honey; but as wasps do not collect honey, the great French naturalist is in error. The badger measures about two and a half feet in length; its legs are very short, and its body flat; its eyes are very small; its neck short and thick; its tail stumpy; and its hide loose and tough. It was this last quality that in ancient times recommended the badger to folks of brutal mind as a fit subject to pit against mastiffs. Badger-baiting used to be a very favourite sport in England; and, despite its many disadvantages, the badger's strong jaws and loose skin made it a formidable antagonist for a dog. No matter what part of the badger's body was seized, it could turn and fix its teeth in its assailant, and inflict on it a terrible bite. The flesh of the badger is eaten in Italy, France, and China, and may be converted into hams and bacon. The skin, when dressed with the hair on, is impervious to rain, and is, therefore, considerably used in covering travelling-boxes. Its bristles are made into painters' brushes. To this family also belong the ratels, or honey-badgers, (*Mellivora*.) The best-known species is the Cape ratel, (*Mellivora capensis*,) which closely resembles the badger both in size and form, but is, perhaps, heavier in its appearance, and has the nose less developed. Its colours are gray above and black beneath. It burrows like the badger, not only to provide itself with a habitation, but also in search of the nest of the wild bees, of whose honey it is passionately fond. It has the same loose hard skin as the European badger, and in this leathery armour it is said to attack the citadels of these irritable insects with impunity.

BAJJERKEIT, *badj'-er-kite*, native name of the short-tailed manis of India. (*See* MANIS.)

BALÆNA, *băl-ee'-nah*, a genus of whales, having no dorsal fin, no teeth in the adult animal, and the abdomen smooth. The baleen, or whalebone, is very long.

BALÆNICEPS, *bal-een'-i-seps*, a genus of herons in which the bill is enormously expanded and of a boat-like shape, the edge of the upper mandible overlying the lower. The tip is strongly hooked. The whale-headed stork (*Balæniceps rex*) is the only known species of this genus. It is sometimes called the Shoe-bird. It is a native of Northern Africa, and haunts the swampy lands about the Nile, generally in flocks of from ten to one hundred in number. It feeds upon fish, snakes, and dead animals, ripping them open with its hooked beak.

BALÆNOPTERA, *băl-een-op'-ter-ah*, a genus of whales, having a sharp and curved dorsal fin, abdomen and throat in longitudinal folds, and very short baleen.

BALANINUS, *bal-an-eye'-nus*, a genus of beetles belonging to the Curculionidæ, in which the snout is very long and slender. The nut weevil belongs to this genus.

BALANCERS, *băl'-an-sers*, in Entom., a term applied to two slender membranous appendages, inserted on either side of the metathorax of insects belonging to the class Diptera. They are always small and movable, and vary much in size and form, according to the class of insects by which they are possessed. They usually consist, however, of an elongated style with a small rounded head. Entomologists differ greatly as to the use of these organs. It is generally believed now, that they are the representatives of the posterior pair of wings, and are attached to the true metathorax. This, however, is disputed by some entomologists, who say that they are attached to the segment, which bears a pair of spiracles, and that they are connected with the function of respiration. The former is the opinion most generally held, and is probably correct. All dipterous insects possess balancers; and as they keep them in constant motion, they are evidently of great importance to them.

BALANITE, *băl'-a-nite*, (Lat. *balanus*, a barnacle,) in Geol., any fossil of the barnacle family. The cirripeds, or barnacles, are not found in a fossil state beneath the Oolite.

BALANUS, *bal'-an-us*, a genus of cirripeds, or barnacles, in which the shell is conical and composed of six laminæ or valves. The operculum consists of four valves.

BALEARICA, *băl-e-a'-rik-a*, a genus of herons in which the bill is short and thick, the cheeks are naked, and there are wattles on the base of the bill and the throat. The crowned crane (*Balearica pavonina*) belongs to this genus. It is a native of North and West Africa, and is conspicuous for its coronet of golden plumes.

BALISOUR, *băl'-is-soor*, native name for the sand-bear of India, an animal nearly related to the badger, and belonging to the weasel tribe. It is a burrower, and is furnished with powerful curved claws. The toes are united throughout their entire length. The scientific name of this animal is *Arctonyx collaris*.

BALISTES, *băl-is'-tees*, a genus of fish of the order Pectognathi. They are known as trigger fish, because the large and sharp first ray of the dorsal fin cannot be pressed down, until the second ray is depressed, when the first shuts down like a gun-lock when the trigger is pulled. On account of their rough and tough exterior, they are also called File-fishes, and Leather-jackets.

Bandicoot, *băn'-di-koot*, (*Perameles*,) a marsupial animal, indigenous to Australia. In some respects it is analogous to the opossum and kangaroo; but its hinder legs, though much longer than the anterior ones, do not present so great an apparent disproportion as in the last-mentioned animal. It is a nocturnal animal, and burrows for itself a dwelling in the soft earth, for which purpose its claws are well adapted. The flesh of the bandicoot is said to resemble that of the rabbit; but the food of the former is generally of a very different nature, consisting chiefly of insects and grubs. Its gait consists of a mixed series of hops; and when the creature is very much hurried, it leaps along much like the kangaroo itself. There are several species of bandicoot, one being remarkable for the length of its nose, and another for the length of its ears, which are so long as to resemble those of the rabbit.

Bankiva, *băn-kee'-va*, a gallinaceous bird from Java. It is supposed to be the origin of our domestic fowl.

Bannock Fluke, popular Scotch name for the turbot.

Banteng, *ban'-teng*, the Javan ox, (*Bibos Banteng*,) a strong, swift, and active animal, living in small herds, and being extremely vigilant. The Borneans catch and domesticate it.

Barbary Ape, Pigmy Ape, Magot, *bar'-ba-re*, in Zool., a species of ape. It is specially interesting, as it is the only one now left in Europe. It is about the size of a large cat, and is greenish-gray in colour, paler underneath. It has no tail, and is sometimes called the tail-less monkey. The muzzle is not so much elongated as in the baboons, and the facial angle is much higher than theirs. It has small, round, reddish, lively eyes, and its ears somewhat resemble those of a human being. The face is nearly naked, and somewhat wrinkled. It usually walks upon four feet; but it can be tamed and taught to walk, though clumsily, on two. They were once found in large numbers at Gibraltar, inhabiting the precipitous sides of the rock. They are gregarious, and live in parts of the rock inaccessible to man; the females carrying their young ones on their backs. They are very seldom destroyed, on account of the amusement they afford by their gambols and tricks. The Barbary ape probably came to Gibraltar from the north of Africa, where it is very abundant, and inhabits rocky mountains. Very few specimens are now to be seen. Bands of them will often plunder gardens, while one of the number keeps a keen look-out. This species of ape possesses a considerable amount of intelligence, and is often seen tame in this country. They must, however, be taught when young, as they often grow sullen and vicious as they grow old. The scientific name is *Macacus Innuus*.

Barbastelle, *băr-bas-stel'*, an English bat, (*Barbastellus communis*.) In this genus the ears are united at their base, and rather large, and there is a flat bare spot on the muzzle, on which the nostrils are placed.

Barbel, (*Barbus vulgaris*,) *barb'-el*, a fish frequenting the quiet and deep parts of rivers, and swimming with considerable strength and activity. It derives its name from the barbs or wattles attached about its mouth. It is now and then found measuring three feet in length; but its average is two feet, and its weight about ten pounds. The Thames produces barbel of a large size. "So numerous are they about Shepperton and Walton," writes Mr Yarrell, "that 150 lbs. weight have been taken in five hours; and on one occasion it is said that 280 lbs. weight of large-sized barbel were taken in one day."

Barbet, *bar'-bet*, a group of birds, allied to the kingfishers, and distinguished by their large conical beaks, and by being bearded with fine tufts of bristles directed forward. They inhabit Java, Sumatra, &c. The generic title is *Bucconinæ*. A variety of the poodle dog is sometimes called a barbet.

Barca, *bar'-kah*, a fish belonging to the Ophiocephalidæ, or snake-headed fishes. It is a native of India, and lives in holes in muddy banks. (*See* Ophiocephalus.)

Barking-Bird, *bar'king*, (*Pteroptochus*,) a native of the South American archipelago, building its nest close to the ground, among the underwood and fallen branches. Says Mr Darwin, "Its name is well applied; I defy any one, at first, to feel certain that a small dog is not yelping somewhere in the forest. Just as with the cheucan, a person will sometimes hear the bark close by; but in vain may endeavour by watching, and with still less chance by beating the bushes, to see its author; yet at other times the 'guid-guid' comes fearlessly near."

Barnacle, *bar'-na-kel*, (Port. *bernaca*,) a marine animal, which attaches itself to ships' bottoms and other submarine substances. These little creatures adhere to the sides and bottoms of floating vessels, to such an extent as to impede their progress, and render necessary their docking and cleansing. These curious animals are now known to be a group of crustacea, and are called Cirrhipeds, *q. v.*

Barnacle Goose. (*See* Bernicle Goose.)

Barracouda. (*See* Sphyræna.)

Bars, *bars*, in the menage, are the upper part of the gums, between the tusks and grinders, which bear no teeth, and to which the bit is applied; by its friction the horse is governed.

Basilisk, *băs'-i-lisk*, (*Basiliscus americanus*.)—Although this creature has no affinity to that terrible serpent believed by the ancients to inflict death by its gaze, yet it is sufficiently ugly to engender an uncomfortable sensation. It is found in South America, and occasionally attains a length of three feet. It is closely allied to the iguanas. Instead of the comb-like ridge of the iguana, the basilisk is furnished with a broad membrane running down its back, and a second, still broader, on the upper surface of its tail. This process is capable of either expansion or contraction, and is supported by a series of little bones, which are processes from the vertebræ of the back and tail. The hind part of the basilisk's head bears a remarkable painted hood, and there is a slight pouch on the throat. Notwithstanding its unsightly appearance, the basilisk is a perfectly harmless reptile.

Basilisk, (Gr. *basiliskos*, from *basilieus*,) a fabulous serpent, said to have been able to kill with its breath or sight only. According to Galen, its colour inclined to yellow; and it had three small eminences on its head. They were speckled with whitish spots, and presented the appearance of a crown. Ælian says that its poison is so penetrating as to kill the largest serpents with its vapour only; and that it will kill a man by merely biting the end of his stick. The sound of its hissing is enough to frighten away all other kinds of serpents. According to Pliny the basilisk is able to kill all those who look upon it. It is also called a cockatrice, from the belief that it was generated from a cock's egg, brooded upon by a serpent. All these details are put forth by Matthiolus, Galen, Dioscorides, Pliny, and Erasistratus. The absurdity of all the statements has since that time been thoroughly exposed. In some apothecaries' shops, formerly, little dead creatures were exhibited, which were said to be basilisks. These were, however, only small birds without feathers, having their heads raised, wings like a bat's, eyes large, and necks very short. At Venice, and other towns on the continent, animals are shown which are called basilisks. They are, however, only small thornbacks, with their fins stretched out, and artificially arranged so as to resemble young cocks. This, Calmet says, he observed in an apothecary's shop in Paris.

Basilosaurus. (*See* Zeuglodon.)

Bassaris, *băs'-sah-ris*, a species of genet, found in South America. Its colour is nearly uniform dun, with a dark collar on the neck. The native name is cacomixle.

Basking Shark, *băs'-king shark*, a large, immensely strong, but still harmless species of shark. By the Irish it is called the sunfish. (*See* Shark.)

Basse, or **Sea-Perch**, *băss*, a marine fish, the *Labrax Lupus* of Cuvier. The fishes of this genus belong to the family Percidæ, or Perches, with whom they are closely allied. The basse is to be met with along the British and Dutch shores, and abundantly in the Mediterranean. By the ancient Greeks and Romans it was highly esteemed as an article of food. On account of its voracity, it was called by the Romans *lupus*, (wolf,) a name still retained as a designation of the species. It was held to be the most cunning of fishes; and Aristotle declares that when encompassed by a net, it would effect its escape by digging a tunnel for itself in the sand. Its length is generally from a foot to a foot and a half; but it has been found of a much larger size. There is an American species of basse, which is termed by Cuvier *Labrax mucronatus*.

Bat, *băt*, (*Cheiroptera*.)—So much do these singular creatures appear to partake of the character of the feathered tribe, that naturalists of an ancient date experienced a difficulty as to their proper classification in the system of nature. The anatomical and intestinal structure of bats entitles them to be ranked as mammalia of a very high order, being placed between the monkeys and the cat tribes. With the bats the anterior members are as completely organised for true flight as those of a bird. As in the birds, the bones supporting the anterior members are large, the humerus rather short, and the bones of the fore-arm long; but the latter are quite separate and movable, as in the human arm. The bones of the fingers, however, instead of being amalgamated, so as to form a single series, are all quite distinct, and, when extended, radiate widely from the wrist, the bones of which are of small size. The thumb is short, but the other four fingers excessively elongated: the first finger is the shortest, and the others of nearly equal length. The four long fingers and the bones of the arm are united by a delicate leathery membrane, which is also united to the sides of the body as far as the extremities of the hind-legs, and sometimes fills up the space between them; and it is by the agency of the broad wings, formed by the extension of the arms and fingers, that the bats are enabled to flutter through the air. The thumbs of the anterior feet are small, free, and furnished with sharp curved claws, by which the animals can suspend themselves to any convenient projection. The thumbs of the anterior hands and the hind feet are the only means by which the bat can progress along the ground, where, as might be expected, it is very awkward in its movements. Dentition varies in the different families, according to the peculiar nature of the creature's food. The body is covered with a soft down, but the membrane of the wings only exhibits a few scattered hairs. The teats are placed on the breast, and the young, when sucking, cling to that part of the mother's body, and are carried about by her. The senses of smell, hearing, and feeling, are very acute, and in some the nose is furnished with a membranous foliation of most delicate structure, by which the sense of smell is probably enhanced. The ears, in many kinds, are expanded, and capable of being folded down; while their full wings and the tissues of the ear and nose are so amply furnished with nerves as to enable them, even though deprived of sight, to pursue their flight through the narrowest passages without danger. On the approach of winter, the bat relapses into a state of lifeless inactivity, and in selecting a spot for hibernation, appears to regard security from molestation before any other consideration. "The hibernation of these animals," writes Mr Bell, "is, indeed, one of the most interesting points in their economy. At an earlier or later period of autumn, according to their species, they retreat, generally in large congregations of various species together, to the most retired places, as under the roofs of houses and churches, in caverns, in the hollows of trees, and similar situations, where they suspend themselves by their hinder claws, with their head downwards. Here they crowd together, holding not only by the surface of the walls of their retreat, but by each other, one crowding over another so closely that it appears scarcely possible for such numbers to occupy so small a space." The common bat, or flittermouse, (*Vespertilio pipestrellus*,) is more frequently met in this country than any of the others. It makes its appearance in the twilight of fine summer evenings in lanes and shady places, or haunts the vicinity of quiet streams, where any sort of nocturnal insects abound. Although not more than two and a half inches long, or about the size of the common brown mouse, it is very voracious, and must in a single evening consume a vast number of insects. In dull weather, no matter though it be the middle of summer, the flittermouse keeps within doors as though it were mid-winter. The long-eared bat, (*Plecotus auritus,*) like the flittermouse, is also commonly found in the vicinity of buildings. It is the most elegant of the bats, and certainly most easily tamed, learning to come at a whistle and take flies from the hand. The ears are very long and transparent; when the animal is sleeping they are concealed under the wings, whilst the inner lobe of the ear still projects, giving the creature the appearance of possessing short slender ears. The mouse-coloured bat, (*Vespertilio murinus,*) the long-eared bat, (*Plecotus auritus,*) and the great bat, (*Vespertilio noctula,*) also count among the well-known British bats. The horse-shoe bat (*Rhinolophus*) resembles the common bats in its general habits, but is even more nocturnal, being satisfied with nothing short of absolute darkness for its place of retreat. The animal derives its name from the possession, above its nose, of a singular leaf-like membranous appendage, shaped somewhat like a horse-shoe. The horse-shoe bats are abundantly distributed over the warmer regions of the earth, but Britain numbers but two of them,—the great and little horse-shoe bat. The largest of these two measures two and a half inches in length, while the lesser is one of the smallest British species of the order. The most terrible of all the bats is the one that has earned for itself the title of Vampyre, (*Phyllostoma spectrum.*) Like the horse-shoe bat, it is furnished with a nose-crest; the canine teeth are large, and in almost all the species there are four incisors in both jaws. Some of them are so large as to measure two and a half feet across the extended wings. There can be little doubt that their favourite food is blood; but the narratives of older naturalists, that "they attack men while they sleep, opening an artery and sucking the blood, lulling their victims the while by gently fanning them with their broad wings, and so continuing till the fountain of life is exhausted," is, to say the least, open to discussion. Captain Stedman was himself bitten, and he thus describes the operation:—"Knowing, by instinct, that the person they intend to attack is in a sound slumber, they generally alight near the feet, where, while the creature continues fanning with its enormous wings, which keeps one cool, he bites a piece out of the tip of the great toe, so very small, indeed, that the head of a pin could scarcely be received into the wound, which is consequently not painful; yet through this orifice he continues to suck the blood till he is compelled to disgorge." Darwin, Swainson, and Waterton agree in considering the bat in question dangerous to life; and the latter attests that he has repeatedly seen both men and beasts who have been sucked, and has minutely examined their bleeding wounds. This naturalist, however, confesses that, although a constant observer in the vampyre's country for the space of eleven months, he could never discover *how* the vampyre drains the blood. "I slept alone in the loft of a woodcutter's abandoned house in the forest; and though the vampyre came in and out every night, and I had the finest opportunity of seeing him, as the moon shone through the apertures where windows had once been, I never could be certain that I saw him make a positive attempt to quench his thirst from my veins, though he often hovered over my hammock." Azara states, that the inhabitants of Paraguay have no dread of these animals, though they frequently enter the houses, and suck the blood of those who may incautiously expose any part of their body.

BATRACHIA, *bă-tra'-ki-a,* soft and naked-skinned reptiles, such as frogs and toads, which in the early stage of existence respire by means of gills.

BATRACHOLITES, *bat'-tra-ko-lites,* (Gr. *batrachos,* a frog, *lithos,* stone), in Geol., fossil remains of frogs and other animals of the same order. The skeletons, vestiges of the soft parts, and imprints of the feet of several genera of true batrachians, occur in the tertiary strata. In the pliocene deposits on the banks of the Rhine at Œningen, and in the paper-coal of the Eifel, several species of frog, toad, and newt have been found. Fossil frogs of a small species very similar to the recent abound in a dark shale overlaid by basalt, in the vicinity of Bombay.

BATRACHOSTOMUS, *bat-ră-kos'-tom-us,* a genus of goatsuckers, remarkable for the very wide gape, and the feather tuft on the head.

BATRACHUS. (*See* FROG-FISH.)

BEAGLE, *be'gel,* a small hound, more remarkable for perseverance than speed, employed in hare-hunting. The precise history of the beagle is involved in some obscurity. By Skinner the term is derived from the French *bugler;* and Menage is of opinion that as the hound was sent from Britain into Gaul, the name may be of British origin. Says Blaine, in the *Encyclopædia of Rural Sports,* "There are even now several varieties of beagles, but formerly there appear to have been several more, from the deep-flewed diminutive type of the old southern hound, to the fleet and elegant foxhound beagle; to which may be added the pigmy breed called Lapdog beagles. Beagles were formerly distinguished by the rough and the smooth. The rough wire-haired, or terrier beagle, is now seldom met with, though it was a hardy and altogether a vermin-loving breed, and very strongly formed. We were once travelling on horseback along a turnpike road, when our ears were struck with a screeching, and the unmusical zaffle of a pack of full-sized rough beagles, and we shall not easily forget how gallantly they rushed through both hedges, and how true to the line they carried the scent across the next field. We are told, on inquiry, that 300 guineas had been refused for this pack." The north-country beagle is a nimble and vigorous hound: he pursues the hare with impetuosity, giving her no time to double; and should the scent lie high, he will with ease run down two brace before dinner. Colonel Thornton, an eminent English sportsman, owned a valuable breed of minute lapdog beagles, and George IV., while Prince of Wales, was in the habit of hunting with packs of well-selected dwarf beagles. Another well-known English sportsman, the late Colonel Hardy, once had a pack of beagles amounting to ten or twelve couples, and so diminutive in size that they were always carried to and from the sporting field in a large pair of panniers slung across a horse. This curious pack was lost to the Colonel in a rather singular manner. It was kept in a barn, which was one night broken open and all the hounds and the panniers stolen; and notwithstanding the most diligent search, no trace of either could ever be discovered.—*Ref.* Blaine's *Encyclopædia of Rural Sports;* Brown's *Anecdotes of Dogs.*

Bear, *bair* (*Ursus*).—Bears are generally inhabitants of the wooded districts of mountainous countries, and occur in all parts of both hemispheres, with the exception of Australia. Of all the carnivora, they are the most omnivorous in their diet, some of them living almost entirely on animal food. Roots, berries, worms, insects, (especially ants,) are equally relished by the bear; but, more than all, he delights in honey, to get at which he will climb trees and assault the strongholds of wild bees, though not uncommonly compelled to beat a retreat before the tiny sting-bearers. Generally, the bears are large heavy animals, with an awkward and shuffling gait. Their anterior limbs, however, are possessed of considerable mobility, and, despite their bulk and great weight, they exhibit great dexterity in climbing. The bear was not so meanly treated by our ancestors as by us; by them, his strength and fierceness were acknowledged, and a stone castle was built for his lodging. To bait him with savage mastiffs was thought fit game to set before the king; and, to this end, there were founded, at Southwark, in Paris Gardens, as it is still called, two circular buildings, somewhat after the style of the ancient Roman amphitheatre. The buildings were unroofed, and contained tiers of seats for the company, with a pit in the centre. The admission to the ordinary part of the bear garden was one halfpenny. In the reign of James I. it was under the protection of royal patent, granted to the holders "for the sole practising and profit of the fighting and combating of wild and domestic beasts in England, for the term of fourteen years. Edward Alleyn, the celebrated actor and founder of Dulwich College, enjoyed this patent for several years. The practice of granting a bear-fighting licence was abolished in 1642, and the bear-master for the time being committed to Newgate for the crime of threatening to cut the throat of any man who voted his bear-garden a nuisance."—*Wild Sports of the World.* The feet of the bear are armed with formidable curved claws, equally available for tearing a carcass or digging up a root. In the GRISLY BEAR (*Ursus ferox*) these claws possess the singular property of independent action, each separate claw being as capable of distinct movement as the fingers of the human hand. The strength of this last-mentioned animal is so prodigious, that it can bear off an ox or bison weighing a thousand pounds. Should it find a carcass, and, being already full, have no immediate appetite for it, the grisly bear will dig a pit and bury it. This propensity to bury is very peculiar. Bear-hunters suddenly overtaken by the animal have stretched themselves along the earth and feigned death; whereon the shaggy sexton has immediately set about excavating a pit, into which the hunter was rolled and covered with earth. It is said that wolves, however famished, will not touch a body buried by a grisly bear, though they will devour any and the vilest offal chance may throw in their way. Another peculiarity of the animal in question is, that he does not hug his prey. His claws are broad, of great length, and edged like a chisel. Eyeing the object of attack intently for a moment, he rushes at it, rears, and strikes with his tremendous fore-paws. Sir John Richardson mentions the case of a hunter who was completely scalped, the skull being laid bare, and the hair turned right over the face, by a blow of the grisly bear's paw. The POLAR BEAR (*Thalarctus maritimus*) equals in size and strength the grisly bear. Indeed, Lamont, the most recent of Arctic explorers, was assured by the Spitzbergers that a full-grown polar bear would attack and kill a bull walrus three times its own size; the bear's hunting tactics being to conceal itself behind an ice-hillock, and watching till the walrus came floating past, spring on its back, and holding on by its teeth to the creature's neck, batter in the skull with repeated blows of its tremendous fore-paws. The polar bear, whose whole life, almost, is passed on the slippery ice, has the soles, as well as the rest of its feet, covered with hair. The respect with which, in some countries, the bear is treated is very curious. When the Lap starts on a bear hunt, he does so with as great a show of solemnity as if he were going to the funeral of a dear relative. When the bear is discovered, and the attacking party are driving at it with their spears, they the while chant a supplication that the bear will not take it amiss, and imploring him not to hurt them. There is no such thing as rejoicing over the death of their enemy. They are afraid even to mention him by name, and allude to him, when obliged, as the "old man in the fur cloak." Sir John Richardson relates a story of an old Indian and his wife, who, while sitting on the bank of a narrow stream, looked up to a monstrous bear facing them on the other side. Having no weapon wherewith to attack the animal, the Indian made an appeal to its better nature. "O bear," said he, "I never did you any harm; I always had the highest respect for you and all your relations. Pray go away and do not molest us." And the bear went away, moved, as the Indian firmly believed, by his eloquence. Sir Emerson Tennent relates, that among the Cingalese there exists a belief that certain charms are efficacious in protecting them from the violence of bears; and that those accustomed to expose themselves to encounters carry a talisman, either attached to their necks or enveloped in the folds of their hair.—*Ceylon,* vol. i. The BLACK BEAR of America (*Ursus americanus*) is smaller than most of the family. Its head is narrower than that of the common brown bear, its ears wider apart, its muzzle more prominent, and it lacks the depression over the eyes. The fur is composed of short smooth hairs, which are of a glossy black for the greater part of their length, instead of possessing the shaggy and woolly character of the comparatively grizzled fur of the brown bear. The value attached to the skin of the black bear—a value that has very much decreased, for the skin that once fetched from twenty to forty guineas is now worth scarcely as many shillings — and the high esteem in which the Indians held their flesh, caused great havoc amongst them. The importation into England in 1783 was 10,500 skins, and ascended gradually to 25,000 in 1803, since which time there appears to have been a considerable decline; as, in a table of exports and imports of skins into Great Britain, published in the catalogue of the first Great Exhibition, the number of bear-skins is 9500. Of these, 8000 are again exported; so that the annual consumption in Great Britain is 1500 only. It is chiefly used in this country for military purposes; as for caps, pistol-holsters, &c. For this reason the animal is frequently called the "army" bear. Inhabiting the Cordilleras of the Andes, in Chili, there is a bear called the Spectacled Bear, (*Ursus ornatus*,) on account of two semicircular marks round the eyes, reminding the beholder of spectacles. This animal is entirely black, with the exception that its muzzle is tawny yellow, and the upper part of the breast inclined to gray. The Syrian bear (*Ursus syriacus*) is probably the oldest on record. This bear it was that avenged the scoffing of the children at the prophet Elisha. The colour of the Syrian bear is stated by some to be brown, and by others to be white, spotted with fulvous white. These changes, however, are supposed to have been occasioned by the abrasion of the long hair, whereby the woolly fur beneath becomes exposed. It is a ravenous beast, and will without scruple attack and destroy the smaller mammalia. The Sloth Bear (*Melursus Lybius*) is one of the most singular of the family. When first introduced to this country, about sixty years ago, it was supposed to be a sloth, and was so named. Bewick, in his *Quadrupeds*, gives a portrait of the sloth bear as an animal that had hitherto escaped the observation of naturalists. It is about the bulk of the brown bear; but its ragged-looking hide gives it the appearance of being larger. The fur of the sloth bear is black, with here and there some brown spots, and two white streaks under the side of the neck, bearing some resemblance to the letter V. The cartilage of its nose is capable of extension, and the lips of considerable protrusion. Its food consists of wild fruits, honey, and white ants; and it generally selects for its home some rocky and solitary cavern. There are several species of this group called Sun Bears, because they are mostly found basking in the sun. There is the Thibetian Sun Bear, (*Helarctos tibitanus*,) a black species, with a white patch on the breast; the Malayan Sun Bear, (*Helarctos malayanus*,) sometimes called the Bruang, also black, with a similar white mark on the breast, and a yellow patch on the muzzle, and lastly the Bornean Sun Bear, (*Helarctos Euryspilus*,) black, with an orange-coloured patch on the breast. All the sun bears are slenderly made, and their fur is not so heavy and thick as that of other bears.

Beasts of Park or Chase are, properly, buck, doe, fox, marten, and roe; but in common and legal sense extend likewise to all the beasts of the forest, which, besides the others, are reckoned to be hart, hind, hare, boar, and wolf, and, in a word, all beasts of venery or hunting. Beasts of Warren are hares, conies, and roes.

Beaver, *be'-ver*, (*Castor Fiber*,) a rodent animal easily distinguished from the rest of the order by its peculiar tail, which is of a nearly oval form, horizontally flattened. The usual length of this animal is about three feet, exclusive of its caudal appendage. In colour, the beaver is reddish-brown, sometimes deepening into black; the hair is of a glossy and smooth nature. The hind-feet are webbed, and adapted to the element in which the animal usually lives. The incisor teeth are remarkably hard and sharp, and act like a chisel. According to Sir John Richardson, the Indians always used these teeth to cut bone and other substances, until the introduction of iron caused their disuse. The same authority says, "When the beaver cuts down a tree, it gnaws it all round, cutting it, however, somewhat higher on the one side than the other; by which the direction of its fall is determined. The stump is conical, and of such a height as a beaver, sitting on his hind-quarters, could make. The largest tree I observed cut down by them was about the thickness of a man's thigh, that is, six or seven inches in diameter; but Mr Graham says that he has seen them cut down a tree which was ten inches in diameter." The sagacity and industry of the beaver have been a favourite theme of naturalists from the time of Buffon to the present day. North America is the great breeding-place of the beaver, and it is there found in considerable numbers. Some thousands of their skins are annually imported into this country. When the beavers are numerous, they are found to inhabit lakes, ponds, and rivers, as well as those narrow creeks which connect the numerous lakes with which North America abounds; but the two latter are chosen by them when the depth of water and other circumstances are suitable, as they have then the advantage of a current to convey wood and other necessaries to their habitations, and because, in general, they are more difficult to be taken than those that are built in standing water. The materials made use of are driftwood, green willows, birch, and poplars, if they can be got; also mud and stones intermixed in such a manner as must evidently contribute to the strength of the dam; but there is no other care or method observed in constructing the dams, except that the work is carried on with a regular sweep, and all the parts made of equal strength. The beaver-houses are built of the same materials as their dams, and are always proportioned in size to the number of inhabitants, which seldom exceeds four old and six or eight young ones. Instead of order or regulation being observed in rearing their houses, they are of a much ruder construction than their dams; for, notwithstanding the sagacity of these animals, it has never been observed that they aim at any other convenience in their houses than to have a dry place to lie on; and there they usually eat their victuals, which they occasionally take out of the water. So far are the beavers from driving stakes into the ground when building their houses, that they lay most of the wood crosswise and nearly horizontal, and without any other order than that of leaving a hollow or cavity in the middle. When any unnecessary branches project inward, they cut them off with their teeth, and throw them in among the rest, to prevent the mud from falling through the roof. It is a mistaken notion to suppose that the woodwork is first completed and then plastered; for the whole of their houses, as well as their dams, are, from the foundation, one mass of mud and wood, mixed with stones, if they can be procured. The mud is always taken from the edge of the bank, or the bottom of the creek or pond, near the door of the house; and though their fore-paws are so small, yet it is held close up between them, under their throat. Thus they carry both mud and stones; while they always drag the wood with their teeth. All this work is executed in the night; and they are so expeditious, that in the course of one night they will collect as much as amounts to some thousands of their little handfuls. As they are frequently seen to walk over their work, and sometimes to give a flap with their tail, particularly when plunging into the water, this has, without doubt, given rise to the vulgar opinion that they use their tails as a trowel, with which they plaster their houses; whereas that flapping of the tail is no more than a habit, which they always preserve, even when they become tame and domesticated, and more particularly so when they are startled. The beaver is found in Europe as well as in America, although differing in one important respect, viz., in the building of its house. Until very recently it was supposed that the European species did not build its habitation like the American beaver, but burrowed along the banks of rivers. It is, however, now known that the American beaver living near the settlements acts in precisely the same manner as its European brethren, and, moreover, that in certain places which are secluded, the latter build their houses after the fashion of their Transatlantic friends. At some remote period beavers are supposed to have been common in Scotland; and tradition implies that Beverley, in Yorkshire, took its name from the circumstance of beavers abounding in the neighbouring river Hull. Giraldus Cambrensis briefly alludes to the Welsh beaver in the 12th century. Indeed, considering all the evidence, traditionary and recorded, there is little doubt that the beaver at one time was common in Britain. Even in America, where it is so abundant, such is the demand for beaver-skins, that it is very probable that the writer who may record its history some few centuries hence, will write the history of an extinct animal.—*Ref.* Dallas, Hearne, Richardson. Its scientific name is *Castor Fiber*.

Beaver Rat, (*Hydromys chrysogaster*.)—This is a rodent which inhabits Van Diemen's Land, and haunts the banks of rivers and the sea-coast. The hinder feet are webbed, so that it is able to swim with great speed. It can also dive well, and catches fish by chasing them through the water, just like the otter. Although very plentiful when undisturbed, it retires before the presence of civilised man, and has vanished from many rivers where it used to exist in great numbers. It has a very pretty fur, dark brown above and golden yellow below. The length is about two feet.

Becker. (*See* Braize.)

Becuna. (*See* Sphyræna.)

Bebeeru, or **Bibiru**. (*See* Nectandra.)

Bee, *be*, (Ang.-Sax.)—Under this name, in England alone, are included about 250 species of insects of the order Hymenoptera. They are divided into two large groups,—the *Andrenidæ* and the *Apidæ*. The species of Adrenidæ are very extensive, and most abundant in the spring. The females construct their nests underground in a singular manner. Usually selecting a sandy situation, they burrow in the ground to the depth of about eight or nine

inches. This hole, which is cylindrical, is only of sufficient dimensions to admit the bee. The bottom, with the aid of some glutinous substance, is made tolerably smooth. This labour accomplished—and, considering the soil is only removed a grain at a time, it is no small labour—it sets forth in search of pollen. This the bee procures from flowers, and carries to her cell on her hind legs, which are thickly covered with long hairs. With the addition of a little honey, the pollen is made into a small paste-ball, in which the egg is deposited, and the mouth of the cell hermetically sealed. In time the egg becomes a larva, and devours the pollen in which it has been enveloped; the larva turns to a pupa, and then the next transformation produces a bee. It, however, remains in a torpid state till the next year. The Apidæ are a more important group; and the habits of the species belonging to it are more variable than the Andrenidæ. To this group belongs the hive or honey-bee, which demands particular attention. In the earliest records may be found notices of this insect. Xenophon, who lived more than 2000 years ago, and who is famous for his remarkably clear and perspicuous narrative, makes particular mention of it in connexion with the injury his men received by eating honey of bees which had fed on deleterious plants. Both Aristotle and Virgil were observers of its habits. Pliny tells us that the philosopher Aristomachus spent fifty-eight years in investigating bee-nature; and Philiscus devoted the whole of his life to this branch of study. Indeed, from the time of the earliest philosophers down to the age of the pious Dr Watts, it has been a favourite theme. The principal modern labourers in this field of science are Swammerdam, Réaumur, Bonnet, Schirach, Thorley, Hunter, and lastly, and greater than all, the blind naturalist Francis Huber, (1750 to 1831.) The patient and ingenious investigations of Huber were the means of bringing some most important evidence on the nature and habits of the bee before the world, which had hitherto been involved in considerable obscurity. But the subject is far from exhausted; and although it has engaged the attention of numerous men of science since Huber's time, it is still at the present time (1862) a subject on which the rays of science, guided by the hand of some future skilful explorer, may throw considerable light. Let us, however, be thankful to those men who have devoted their whole lives to the investigation of so humble a particle of animated nature, and take a brief and rapid survey of the result of their labours. A beehive contains three classes of inhabitants,—the *working-bees*, the *drones*, and the third order, represented by only one member,—the *queen-bee*. The first class is the most important. They are ascertained to be undeveloped females; consequently, incapable of taking part in the reproduction of their species. The drones are the males, and exist but for the propagation of their kind. The queen-bee is the *mother-bee* of the whole colony, and lays about 200 eggs a day through the whole season, from early spring to September. The anatomy of the working-bee forms one of the most interesting portions of entomology. Its body is about half an inch in length, of a blackish-brown hue, and is covered with thick hairs, which serve the insect for the purpose of collecting pollen. The most singular part of the body is that which is called the *proboscis* This instrument, if casually observed, appears to be a single tube, and formerly it was considered so to be by naturalists. Examined through the microscope, however, it appears a slender projection composed of some forty cartilaginous rings, fringed with fine hairs. It is formed of five parts, a central stalk and four lateral ones,—two on each side. The central part, used for collecting honey, is aided by the fringed hairs, lapping up like a tongue, anything to which the proboscis is applied, and then conveyed to the pharynx, or honey-bag, whence, in due time, it is disgorged into the cells of the comb. The structure of the other portions of the mouth are beautifully adapted to their several uses. The bee has three pairs of legs, the anterior ones being the shortest, and the posterior the longest. The latter have a cup-like cavity on the fore-leg, which the bee uses to contain the pollen it collects. The legs are all covered with hairs, and more particularly the ones which carry the pollen. There is a pair of hooks attached to each foot, which enable the bee to walk on the roof of the hive. It was clearly demonstrated by Huber that respiration was as essential to the bee's existence as that of any warm-blooded animal. Situated behind the wings are *spiracles*, or air-openings, which admit air for the purpose of oxygenating the circulating system. That these *spiracles* were the instruments of respiration, Huber proved by immersing a bee in water: so long as the air-openings were free, the insect lived; immediately they were placed under water, the bubbles which escaped from them proved their use, and the bee ceased to exist. The abdomen contains the honey-bag, the stomach, the wax-bag, the venom-bag, and the sting. The honey-bag, though occasionally called the first stomach, is not used for the purpose of digestion; it is a small bag, about the size of a pea, with two pouches behind, and is properly only an enlargement of the gullet. This receptacle receives the honey from the proboscis, as already stated. A small passage thence leads to the stomach, which receives and digests the food of the bee. It was formerly supposed that the wax of the bee was the pollen elaborated in the stomach, and afterwards ejected by the mouth. The celebrated anatomist John Hunter discovered two small pouches in the lower part of the abdomen; and it was found that the wax is derived from the saccharine matter consumed by the bee, and that it is secreted from vessels on the surface of these pouches. After the wax has remained there for a time, it appears externally in scales, usually eight in number, below the medial rings of the abdomen, and is removed by the bee itself or one of its fellows. One of the most important and beautifully developed organs is the *sting*, which lies close to the abdomen. Viewed through the microscope, it presents one of the most elaborate and exquisitely-defined pieces of mechanism to be found in the wondrous workshop of Nature. It consists of two long darts, adhering longitudinally, and protected and encased by one sheath. The fineness of this apparatus may be shown by the fact that the sheath itself, which is not nearly so sharp as the darts, placed under a magnifying lens exaggerating its proportions some two hundredfold, is, towards the point, quite invisible. When wishing to use the sting, the sheath is first protracted and inserted; then the two fine darts follow, and are also inserted. The puncture being made, the poison is conducted in a groove to the end of the sheath. And now the most singular part of the business follows. The long darts are armed with nine or ten barbs at the end, and this prevents them from being too quickly withdrawn. Immediately the poison flows in, the darts are withdrawn, and the deadly liquid has a cavity to enter, which soon festers, and produces death. The nature of the poison is not known; it possesses, however, a certain acidity, which will redden vegetable blues. With regard to the other senses of the bee, the evidence is far from satisfactory. It has five eyes in all,—three on the top of the head, and two compound eyes on the sides. Springing from between the latter are two tubes, curving outwards on each side, these are called the *antennæ*, or "feelers." The *antennæ* are extremely sensitive, and, indeed, nearly the most useful organs of the bee. By their aid it builds its cells, feeds the young, and stores the hive. They are also used as a medium of recognition with its kind. The combs of a beehive comprise a congeries of hexagonal cells, built by the bees as a receptacle for honey and for the nurseries of their young. Each comb in a hive is composed of two ranges of cells backed against each other: the base, or partition, between the double row is so disposed as to form a pyramidal cavity at the bottom of each. There is a continued series of these double combs in every well-filled hive, the spaces between them being just sufficient to allow two bees, one on the surface of each comb, to pass without touching. Each cell is hexagonal, the six sides being perfectly equal. This figure insures the greatest possible economy of material and space. The outer edges of the cells are slightly thickened, in order to gain strength. The same part is also covered with a beautiful varnish, which is supposed to give additional strength. The construction of several combs is generally going on at the same time. No sooner is the foundation of one laid, with a few rows of cells attached to it, than a second and a third are founded on each side, parallel with the first; and so on, till the hive is filled, the combs which were commenced first being always in the most advanced state, and, therefore, the first completed. The design of every comb is sketched out, and the first rudiments laid, by a single bee. This foundress bee forms a block out of a rough mass of wax, drawn partly from its own resources, but principally from those of other bees, which furnish wax from small sacs, in which it has been secreted, that are situated between the segments of the body of the bee, taking out the plates of wax with their hind-feet and conveying it with their fore-feet to their mouths, where it is moistened, and rendered soft and ductile. The mass of wax prepared by the assistants is applied by the foundress bee to the roof or bottom of the hive, and thus a slightly double convex mass is formed. When of sufficient size, a cell is sculptured on one side of it by the bees, who relieve one another in the labour. The cells intended for the drones are considerably larger, and more substantial, than those of the workers, and being formed subsequently, they usually appear nearer the bottom of the comb. Last of all are built the royal cells for the queens: these are situated in the very centre of the hive, and number from three to twelve. When the cells are ready, the queen begins to lay her eggs. The fecundation of the queen-bee is very extraordinary. It has been pretty clearly ascertained that no connexion takes place with the drones *in the hive.* The question naturally arises, why this large number of drones in a hive? Huber's investigations have to a certain extent cleared away the mystery. According to this eminent naturalist, fecundation takes place by contact in the air; and it is consequently essential that the number of drones should be large, that the queen-bee may be sure of meeting them when going abroad. One intercourse is sufficient to render the queen-bee fruitful for two seasons. It is estimated that she gives birth to 100,000 bees in a single season. The eggs which are to produce working-bees are laid first. These are carefully watched; and, when they are hatched, the larva is fed with mixed honey, pollen, and water, by what are called *nurse-bees,* whose whole work is to *nurse* the young bees. Not until eleven months have elapsed in laying working-eggs, does the *mother-bee* commence laying the male and royal eggs. The *nursing* of the latter is managed on a grand scale. The royal larva disdains simple honey or pollen; it must have rich *jelly,* and in such quantities that her highness's cell is saturated with it. This waste is rather contradictory of the bee's frugality; but bees are wonderfully loyal creatures. From the egg to her majesty bee, the whole time occupied in the metamorphosis is about sixteen days. Now the bees only require one queen at a time; indeed, most monarchical institutions would find it extremely inconvenient to have more. So these newly-hatched majesties must be kept confined until the throne is vacant. There is also another important reason why they are not set at large. When two queen-bees meet, it is certain death to one. At the same time they cannot manage without a queen; and each time a swarm take their departure, a queen is always at their head. There are generally too many royal bees; hence, when they are brought together, a fight ensues, and the number is diminished. Perhaps the most singular phenomenon in bee history is the *making of a queen.* On extraordinary occasions, when the hive by some accident is deprived of a queen, and destitute of royal larvæ, a wonderful provision is resorted to. One of the working-larvæ is selected, deposited in a royal cell, fed on the same food which is administered to the royal larva, and it ultimately becomes a queen. The only explanation that can be given is, that the peculiar food provided has the effect of rendering the honoured insect fertile. Towards the beginning of August, a good stock of eggs having been laid, the drones are no longer required; and winter, long and dreary, is before the industrious bees. What must be done with the lazy ones? They are massacred by the workers. A buzzing commences in the hive; the heavy drones and the nimble workers grapple and hug; but the strength of the lazy drones avails them nothing; the sharp stings of the workers pierce them through, and presently the ground is heaped with the slain. The law relating to bees is peculiar. The insects are, according to Blackstone, wild by nature; but, when hived and properly reclaimed, are regarded in the nature of property, belonging to the person on whose ground or soil they have swarmed. In support of this doctrine, Blackstone refers to the Charter of the Forest, 9 Henry III. c. 13, which allows every freeman to be entitled to the honey found within his own woods. The qualified property which may be thus held in bees continues while the swarm remains on the soil, and, in the event of flight, so long as the owner can pursue it. Indeed, so clearly are they considered, in law, of the nature of property, that it has been decided in England that bees may be the subject of larceny. According to Scotch law, as propounded by Mr Erskine, bees who abandon their hive without being observed and followed, are understood to have recovered their original liberty: any one, in such a case, may hive and claim them. For details of management, *see* BEEHIVE and KEEPING OF BEES.

BEE-EATER, *be-e'-ter,* (*Merops apiaster.*)—These birds are found in large numbers in the southern and eastern provinces of Europe and the northern districts of Africa. They build their nests in clay and sand banks, and associate so closely together, that the earth appears like a honeycomb. There is some analogy between these birds and the swallows; indeed, in the neighbourhood of the Cape, where they most abound, they are called by the Dutch Mountain Swallows. In certain parts of Africa they are much respected by the natives, who have a belief, that by following one of them, the discovery of a store of honey will be the certain result. They are larger than the common swallow, and have a long and slightly-curved beak. Their colour is a blending of white, and brown, and green.

BEEF-EATER, a genus of birds only found in Africa. This bird belongs to the order Insessores, tribe Conirostres, family Sturnidæ. They have short bills, swelling towards the point, and square at the base. They subsist upon the larvæ of gadflies, which they find in the hides of buffaloes, camels, and other large quadrupeds. They perch upon the backs of these animals, and Dr Livingstone states, with regard to one of the species,—the buffalo-bird, that as their sight is keener than that of the buffalo, they see the approach of danger first. When the buffalo perceives that the birds are flying away, he is warned that he is in peril, and begins to look around him. The beef-eaters are sometimes called ox-peckers.

BEEHIVE, *be'-hive,* (Ang.-Sax. *hyfe,* a house,) a term applied to the habitation of bees. They are usually made of straw or wood. The former substance is most common, as the honey is liable to melt in wooden hives during hot weather. Glass hives, or hives with glass doors or windows, so as to observe the motions of the bees, are now much used, and in Greece and Turkey the hives are principally made of earthenware. The shape of a beehive is not of much consequence, but it is considered of importance to have the hive so constructed as to be enlarged above or below at pleasure. Beehives should always be situated in the neighbourhood of flowers. Honey made from heather-flowers is much esteemed in Scotland; and when the season of the heather-bloom comes on, a large number of hives are removed to the moors and hills. In Egypt hives are removed from place to place on the Nile in barges, in order to reach the places where particular flowers are in season. Beehives are usually about eighteen inches above the ground, and are generally protected with a shed or straw hood, to protect the bees from the rain.

Beet-Fly, (*Anthomyia Betæ,*) an insect not so large as a common fly, which deposits its eggs on the leaves of beetroot or mangel-wurzel. When the larvæ leave the eggs, they devour the soft parts of the leaves, giving the plant a scorched and blistered appearance. It is a dipterous or two-winged insect, and belongs to a genus whose larvæ infest and feed upon the roots of cabbages, turnips, &c. (*See* Cabbage-Fly, Turnip-Fly, Potato-Fly.)

Beetle, *be'-tel.*—This term is frequently used to designate the large tribe of insects called *Scarabæides,* but it is more frequently and correctly used as the name of those insects which are covered with a strong horny substance, and have the abdominal part of the body guarded by two sheaths, under which the wings are folded. Hence the word is often used in works on natural history as the ordinary designation for coleopterous insects. (*See* the articles Scarabæides, Stag-Beetle, Tiger-Beetle, Bombardier-Beetle, Burying-Beetle, Goliath-Beetle, Rose-Beetle, &c.)

Behemoth, *be'-he-moth,* an animal of great strength, described in Job xl. 15-24, and nowhere else mentioned in Scripture. Commentators are very much divided as to what animal is meant. By some it is understood to be the elephant, by others the hippopotamus; the general opinion seems to be in favour of the latter.

Belemnites, *be'-lem-nites,* (Gr. *belemnos,* a dart,) in Geol., fossil remains of extinct naked cephalopods allied to the squid and the cuttle-fish. They are found in large numbers in the chalk and oolite, generally as straight, solid, dart-like stones. These relics of creatures which thronged the seas of the secondary period have ever been objects of wonder, and the wildest speculations have been advanced to explain their origin. The popular names for them, such as devil's fingers, spectre-candles, arrow-heads, picks, and thunderbolts, indicate the different views taken of their nature by the ignorant. To the philosophers of the last century the belemnite was a standing puzzle, and the guesses which were called forth from time to time appear to us to be scarcely less absurd than the popular beliefs. It was said to be a product of electric action, and given the learned name of *lapis fulminans,* or thunderstone. According to other hypotheses it was a stalactite, a crystal, petrified amber, and lastly, when fossils began to be looked upon as actual organic remains, it was held to be the tooth, or perhaps the spine, of some unknown creature. It is now known to be the internal bone or shell of a cephalopod, and corresponds to the slender and insignificant *pen* of the common squid. Although the most common belemnites are mere tapering stones, some have been found so well preserved that naturalists have been able to form from them a vivid image of the living mollusc. "The belemnite," writes the unknown author of "Vestiges of Creation," "is an elongated conical shell terminating in a point, and having, at the larger end, a cavity for the residence of the animal, with a series of air-chambers below. The animal, placed in the upper cavity, could raise or depress itself in the water at pleasure, by a pneumatic operation upon the air-tube pervading the shell. Its tentacula sent abroad over the summit of the shell searched the sea for prey. The creature had an ink-bag, with which it could muddle the water around it, to protect itself from more powerful animals; and, strange to say, this has been found so well preserved, that an artist has used it in one instance as a pigment wherewith to delineate the belemnite itself." One genus of the Belemnite family, called *Belemnoteuthis,* and occurring in the lias and oolite, is occasionally discovered with the remains and impressions of the soft parts; namely, the mantle, body, and tentacles.

Bell-Bird, (*Arapunga alba,*) a native of Guiana, and distinguished by a fleshy cylindrical appendage above the base of the bill, very much resembling in shape the horn of the fabled unicorn. Generally, this appendage is decorated with a few fine feathers, and it can be raised or depressed at the will of the bird. Its voice is very peculiar, and much resembles the tolling of a bell. Waterton asserts that the sound it emits may be heard at a distance of three miles. It is of a pure white colour, and about a foot in length. It is allied to the chatterers.

Bell-Bird of Australia. This is a species of honey-eater, (*Myzantha melanophrys,*) whose note resembles the tinkling of a small bell. Travellers are always glad to hear this sound, as it is a proof that water is at hand.

Bellerophon, *bel-ler'-o-fon,* in Geol., a genus of fossil shells occurring in the Silurian, Devonian, and carboniferous strata. As in the existing argonaut, the shell consists of a single chamber.

Bellows-Fish, a curious fish belonging to the order Acanthopterygii and the family Centriscidæ. It derives its name from the great prolongation of the snout, which gives to the fish a very bellows-like aspect. Sometimes it is called the Trumpet-fish, and sometimes the Sea-snipe. Its scientific name is *Centriscus scolopax.*

Belone, *bee-low'-nee,* a genus of malacopterygian fishes, having a very long body and pointed snout. The common "sea-needle" belongs to this genus.

Belly. (*See* Abdomen.)

Beloptera, *be-lop'-te-ra,* (Gr. *belos,* dart, *pteron,* wing,) in Geol., a fossil resembling a belemnite, but less pointed, and having a wing-like projection or process on each side. It occurs in tertiary strata, and was evidently the internal bone of a cephalopod. The name *Belosepia* (Gr. *sepia,* cuttle-fish) is given to another kind of belemnite found in tertiary deposits; and that of *Beloteuthis* (Gr. *teuthis,* squid) to one shaped like a spear-head occurring in the Lias.

Beluga, *be-lu'-ga,* a genus of cetacea belonging to the Delphinidæ, or Dolphins. It has a broad blunt head, and no produced snout; thus differing from the rest of the family to which it belongs. Its form is principally characterised by the softness of its curves, and the clear white colour of its skin, which is so tender that it often fails to retain the harpoon. The beluga also differs from the ordinary family of dolphins in having fewer teeth, which fall out before the animal is old, and it has no dorsal fin. It usually attains the length of thirteen feet, and feeds principally on fish.

BENTEOT, native name for the Javanese Pie, (*Crypsirhina varia.*) It is a handsome kind, the deepest green in colour, shot with bronze. It is very shy, and keeps aloof from human habitations.

BERIGORAH, *bĕ-rig'-o-rah*, native name for the cream-bellied falcon of Van Diemen's Land, sometimes called the Brown Hawk. It is very plentiful, so that thirty or forty may be seen on a single tree, and flocks of a hundred are not uncommon. It is a very useful bird, feeding chiefly on insects, especially caterpillars. Its scientific name is *Ieracidea berigora.*

BERNICLE GEESE, *ber'-ni-kel.*—The bernicle geese are marine in their habits, and feed almost entirely on algæ and grass-wracks, (*Zostera marina.*) Like the common goose, they are only winter visitors to our climate, and pass during the summer to the highest northern latitudes. The bird owes its name to a ridiculous notion. It was formerly believed (it can scarcely be said that the belief is to this day entirely abandoned) that these birds were produced from the common bernacle, or barnacle, the latter originating, in their turn, from the fruits of a particular tree, whose branches dipped into the water. "There is," says Gerard, (who lived in the reign of Queen Elizabeth,) "a small island in Lancashire called the Pile of Foulders, (on the west side of the entrance into Morecombe Bay, about fifteen miles south of Ulverston,) wherein are found the broken pieces of old and bruised ships, and also the trunks and bodies, with the branches of old and rotten trees cast up there likewise, whereon is found a certain spume or froth, that in time hardeneth unto certain shells in shape like those of the muskle, but sharper pointed, and of a whitish colour, wherein is contained a thing in form like a lace of silke finely woven, as it were, together; one end whereof is fastened into the inside of the shell, even as the fish of oisters and muskles are; the other end is made fast into the belly of a rude mass or lump, which in time cometh to the shape and form of a bird: when it is perfectly formed the shell gapeth open, and the first thing that appeareth is the aforesaid lace or string; next come the legs of the bird hanging out, and as it groweth greater it openeth the shell by degrees, till at length it is all come forth, and hangeth only by the bill. In short space after it cometh to full maturitie, and falleth into the sea, where it gathereth feathers, and groweth to a fowl bigger than a mallard, and lesser than a goose, which the people of Lancashire call by no other name than a 'tree-goose;' which place aforesaid and all those parts adjoining do so abound therewith that one of the best is bought for three pence." The scientific name is *Bernicle leucopsis.*

BETTONGIA, *bĕt-tong'-i-ah*, a genus of marsupials found in Australia, and allied to the kangaroo. The head is very short and broad.

BEZOAR STONES, *be-zor'*, (Persian *pa-zahar*, antidote to poison,) concretions found in the stomachs of various animals. They are brittle egg-shaped masses, about the size of a small walnut, and are mostly dark olive in colour. On being cut open, they present the appearance of a nucleus surrounded by concentric deposits. They occur principally in the stomachs of Oriental goats, deer, and antelopes, and were formerly looked upon as possessing supernatural properties. They cured all diseases, and acted as antidotes against every poison; and were so much sought after as to be worth ten times their weight in gold. The most valued of these was obtained from the wild goat of Persia, and was called the *lapis besoar orientalis.* They are found, more or less, in all herbivora, and sometimes occur in the stomachs of persons living much on farinaceous food. They contain lithofellic and ellagic acids.

BHUNDER, *bŭnd'-er*, an Indian monkey belonging to the family of the Macaques. Its scientific name is *Macacus rhesus.* Thousands of these animals swarm about the temples, and being considered as sacred, are allowed to take any liberty with impunity. At Bindrabun more than one hundred gardens were cultivated expressly for the bhunder monkeys.

BIBOS, *by'-bos*, a genus of mammalia belonging to the buffaloes. The animals of this genus are known by the very high shoulder blade. The banteng or Javan ox and the gaur of India belong to this genus.

BICEPS, *bi'-seps*, (Lat. *bis*, twice, *caput*, a head,) in Anat., is a common name applied to several muscles of the human body, from their having two distinct origins or heads: The principal of these are the biceps flexor cruris and the biceps flexor cubiti, the former situated on the hind part of the thigh, the latter on the fore part of the os humeri.

BICORNIS, *bi-kor'-nis*, (Lat. *bis*, and *cornu*, a horn,) is a term sometimes applied in Anat. to the hyoid bone, from its having two processes like horns. Formerly, it was also applied to muscles that had two terminations.

BICUSPIDES, or BICUSPIDATI, *bi-kus'-pids*, (Lat. *bis*, and *cuspis*, a spear,) in Anat., is applied to the two first pairs of molars in each jaw, from their having two spearlike tubercles.

BIGHORN, a popular name for the Rocky Mountain sheep of California, the *Ovis montana.* The height of the animal is three feet, and the horns are of the same length, and of enormous diameter at the base. It is very shy, and as difficult to kill as the chamois.

BILE, *bile*, (Lat. *bilis*, said to be derived from *bis*, twice, and *lis*, contention, as being the supposed cause of anger and dispute,) is a peculiar oily fluid secreted from the blood by the liver. In man it is generally of a yellowish-brown colour, and has a bitter taste. According to Berzelius, its constituents are, in 1000 parts, 908·4 water, 80 picromel, 3 albumen, 4·1 soda, 0·1 phosphate of lime, 3·4 common salt, and 1 phosphate of soda. The primary cells of the liver separate the bile from the blood of the portal vein, and discharge it into small ducts, which unite to form larger ones, terminating in the ductus communis choledochus, whence it is conveyed into the duodenum. It there mixes with the digested food, and performs the important office of fitting it for absorption into the system. The bile thus mixed with the elements of nutrition becomes in part also absorbed; the excrementitious portion passing out of the body, with the other indigestible materials, and imparting their peculiar colour to them. When digestion is not going on, the bile ascends through the cystic duct to the gall-bladder, where it is stored for future use. The principal use of the bile is to separate the chyle from the chyme. It also aids in exciting the peristaltic motion of the intestines, and thus causes them to evacuate their contents sooner than they would otherwise do; for, when there is a deficiency of bile, the bowels are in general extremely torpid. When, owing to some functional derangement, the bile is absörbed into the blood and carried through the system, it imparts a yellow tint to the surface of the skin. (*See* JAUNDICE.) When from any cause the bile is in excess in the blood, or when the liver only imperfectly performs its function of secreting it, the person is said to be bilious. (*See* LIVER.)

BILIARY CALCULI, (Lat. *calculus*, a small stone.)—These are sometimes called gall-stones, and are often found in the human gall-bladder in large quantities. They are either semi-transparent and crystalline, or strongly coloured with the bile. They mostly consist of cholesterin deposited on a nucleus of phosphate of lime.

BILIARY DUCTS, *bil'-ya-re*, in Anat., are those ducts or canals which convey the bile from the liver to the duodenum.

BILL, *bill*, (Ang.-Sax. *bill*, a beak,) in Orn., the beak or hard horny mouth of a bird, consisting of two mandibles. There is no appearance of lips either in the upper or lower jaw; and, except in the cases of parrots in the fœtal state, and some varieties of waterfowl, they are not furnished with proper teeth. In the two exceptions mentioned, the rudiments of teeth have been observed. A portion of the bill at the base of the upper mandible is covered with a membrane, which is called the *cere*, from the waxy appearance which it presents in some species of birds. It is sometimes covered with feathers, and sometimes it is naked; but it is often found protected by hairs or bristles. The nostrils of a bird are usually situated in the *cere*, but in some cases they are placed so far forward as hardly to be observable. The bills of birds vary in shape according to their habits and the different substances upon which they feed. The bills of birds of prey are very strong, the upper part being hooked, and very sharp, so as to be able to tear and cut to pieces the flesh of the animals upon which they seize. A strong short bill, with the edges sharp and notched, is the usual indication of courage in a bird, and a sign that it preys upon living animals. The great variety in the modification of the forms of bills is very interesting, and is treated of under the names of the different species of birds; such as crop-bills, spoon-bills, horn-bills, parrots, &c. In the case of those birds which live upon insects, the bill is very seldom found hooked, but usually short and slender. The bills of those birds which catch insects flying, are remarkable for their deep division, which enables them to gape widely. Birds which live upon seeds have short but powerful bills, with which they can crush their food. Aquatic birds have, as a general rule, broad sensitive bills, which are provided with laminæ on the inner edge, for the purpose of straining the muddy water, from which they take the principal part of their food. The bills of every species of bird which extracts its food from mud are modified according to the nature of the food it seeks. Besides the general use of tearing or crushing food, the bills of birds are used when fighting with each other, and also for the purpose of dressing their plumage, building their nests, and for other functions. Many fishes and reptiles have mouths resembling bills, and the *Ornithorhynchus paradoxus* is a singular specimen of a quadruped with a bill-shaped snout.

BILL-FISH, popular name for the PIPE FISH, (*Syngnathus acus.*) This curious fish belongs to the order Lophobranchii, and is closely allied to the well-known hippocampus or sea horse. It is not uncommon upon our coast, and can be kept in an aquarium.

BIMANA, *bi'-mă-na*, (Lat. *bis*, twice, *manus*, a hand,) the first order of mammalia, reckoning in its number the human species only. The term has reference to man in an animal sense alone, and alludes to the two hands which form the terminations of the fore limbs or arms. No other animal except man possesses two hands. The monkey tribes are distinguished by having thumbs at each of the four extremities of their limbs, and are consequently called *quadrumana*, or four-handed animals. Man, as an intellectual being, is considered so far above the brute creation, that the term *bimana* is not inserted in many zoological systems; but as the name only relates to the bodily structure of the human being, it is very generally used by zoologists.

BINTURONG, *bin'-tew-rong*, an animal allied to the ichneumons, and found in Malacca. It is black, and heavily covered with long, coarse hair. It is a good climber, and is aided by its prehensile tail. Being a nocturnal animal, it can scarcely be induced to show itself in the daytime, and if in a captive state, can only be induced to move by a piece of apple. The scientific name is *Artictis Binturong.*

BIOLOGY, *bi-ol'-o-je*, (Gr. *bios*, life, and *logos*, a discourse,) is the science of life. In its widest sense, it includes life in all its forms on earth, and thus comprehends within its sphere all living organised beings. In a more restricted sense, it regards man only, and in this view it may be said to correspond with Physiology. (*See* PHYSIOLOGY.)

BIPAPILLARIA, *bi-pap-il-lair'-i-a*, (Lat. *bis*, twice, *papilla*, a nipple,) a term applied by La Marck to a genus of marine mollusca, described and illustrated by Peron in his manuscript notes. La Marck defines it as possessing a naked body, of a shape between oval and globular, terminated posteriorly by a tail, having at its extremity two conical papillæ,—whence the name.

BIPED, *bi'-ped*, (Lat. *bis*, twice, and *pes*, *pedis*, a foot,) an animal having two feet, as man, birds.

BIPES, *bi'-pees*, (Lat. *bis*, twice, *pes*, a foot,) a genus of reptiles belonging to the order Saura, or Lizards. It is interesting as showing the gradation between one type of animal form and another, and is the connecting link between the lizard and the serpent. One of the species, the *Bipes lepidopodus* of Lacépède, was dissected by Cuvier, who found that though its posterior and only apparent pair of feet had merely the external form of two scaly plates, the integument, in reality, covered a femur or thigh-bone, a tibia and fibula, leg-bones, and four metatarsal or finger-bones.

He, however, found no phalanges or terminal finger-bones; and also noticed that one lung was larger than the other by one half. The *Bipes lepidopodus* of Lacépède has the body and tail very slender and almost cylindrical, and bears a resemblance to the common blind-worm or slow-worm, (*Anguis fragilis*,) so common in many parts of England. These reptiles also possess the rudiments of limbs in their skeletons. The *Bipes lepidopodus* has the upper part of its head protected by nine large scale-plates; its eyes being surrounded with small scaly globules. Its teeth are equal and small, its mouth large, and its tongue, which is long and flat, is not notched. The organs of hearing are situated above the angle of the lips. The scales on the under-part of the belly and tail are hexagonal and smooth, but the scales on the back are lozenge-shaped, striated, and small, especially those in the highest part. About the centre of the reptile, two rudimentary feet, with no appearance of fingers, and covered with small scales, can be observed. Its colour is greenish, with small black blotches scattered over it. It is a native of Australia. Lacépède says of it: "This reptile, like the other species of bipes, ranks between the oviparous quadrupeds and the serpents. It is related to the latter by its general form as well as by the figure, proportion, and distribution of the scales, while it approaches the former by its auditory apertures, and by the hollow tubercles near the anus."

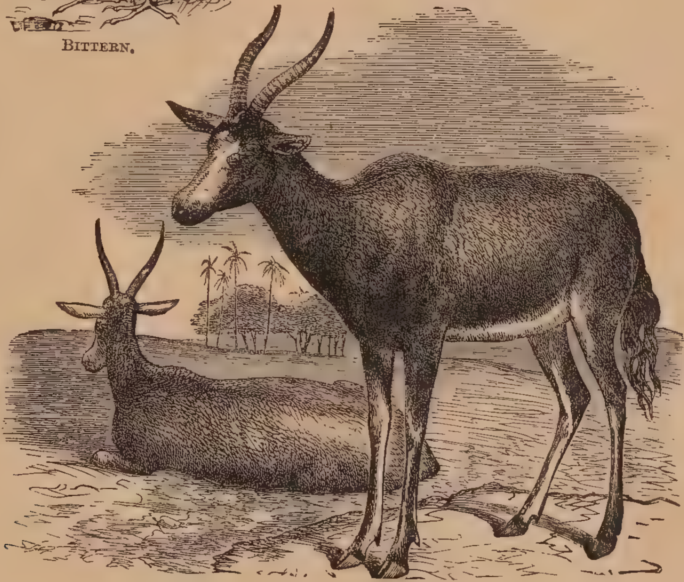
BIRD-CATCHING, the art of taking birds or wildfowl alive. It is performed in a variety of ways according to the season of the year or the species of bird intended to be caught. Some birds are taken by burning sulphur at night under the trees upon which they have been observed to perch. Pheasants are sometimes caught in this way. If wheat or any other grain, steeped in a mixture of wine-lees and hemlock-juice, be scattered in places where birds resort, they become intoxicated after eating, and are easily taken. Birds are also taken by means of birdlime. The principal methods employed in catching birds, however, are by means of traps and nets. Like everything else, the trapping and catching of birds is a matter of practice, study, and experience. The most primitive form of trap is the common brick-trap. It consists of two bricks placed lengthwise upon their narrow sides, a third across their extremities, and a fourth at the opposite end, so as to form a sort of lid. In the central opening a stout piece of stick is driven, and between this and another similar piece supporting the lid, a forked twig is placed. When the bird alights on one of the forks of the twig, the other two sticks give way, and the lid falls, securing the bird. The next easiest of construction is the Sieve-trap. An ordinary sieve is propped up by a slight stick at an angle of about 45 degrees: some seeds or crumbs of bread are strewn under the sieve, and a string attached to the supporting stick is held by the bird-catcher, who remains concealed at a short distance. When the birds gather round the food, the string is pulled, the sieve falls, and the birds are caught. The next bird-catching machine, the Springle, is more difficult to construct. At the smaller end of a hazel switch four feet long, which is called the spring, a piece of string about fifteen inches long is tied. Nearly at the end of this string, the catch, which is a little piece of wood half an inch long, about half as broad, and one quarter as thick, is fastened. A small piece of the wood is shaved off one side of this catch, in order to adapt it for a notch in another part of the springle; a loose slip-knot made of two long stout horse hairs is then fastened to the end of the string below the catch. A smaller switch, about a foot and a half in length, is bent back at the smaller end, and fastened within an inch or so of the thicker end, in which a notch is cut, in order to receive the end of the catch: this is called the spread. A stump and a bender, which is another pliant bit of switch, each a foot and a half in length, complete a springle. It is set in the following manner:—The stump is thrust into the ground; the bow of what is called the spreader is placed over it; and then, about the length of the spreader from the stump, the two ends of the bender are pushed securely into the ground. The thick end of the long switch or spring is then planted at a convenient distance from the bender. It is bent down until one end of the catch can be put upward on the inside of the bender. After lifting the spreader an inch from the ground, the smaller end of the catch is placed in the notch, and the springer is retained from springing up. The hair slip-knot is lastly laid round the spreader, and some crumbs or seeds laid in the inside of the trap and scattered about its neighbourhood. The springle is then set. When the bird alights upon the spreader, it falls with its weight, the catch is released, the springer flies up, and the bird is caught by the neck, wings, body, or legs, in the horse-hair slip-knot. A number of birds are caught by horse-hair loops which are fastened to a long string, which is laid in a series of rings winding outward from the centre, so that the space of ground is covered with them. When disposed in a place where birds resort, it generally occurs that if a bird gets his foot into a loop, he draws it tightly round his leg, and is thus caught.

BIRDS OF PARADISE, *păr'-a-dice*, (*Paradiseidæ*.)—These natives of New Guinea may be justly regarded as the most magnificent of the feathered tribes. Concerning them the most fanciful conjectures have been indulged in, not the least curious being one encouraged by Buffon, that the bird, having no feet, and being unable to walk or swim, was compelled to live entirely on the wing. This error, doubtless, took root in the fact that the legs of the bird being its least ornamental parts, were detached from the skin before they were prepared for exportation. They have great diversity of beauty. Some of them have thinly-barbed feathers to cover the closed wing, so prolonged as to form immense tufts, and extending far backward beyond the body. The EMERALD BIRD OF PARADISE (*Paradisea apoda*) is rather longer than the common thrush. Its general colour is a deep cinnamon, with the exception of the top of the head and the back of the neck, which is a deep yellow; the feathers which decorate the base of the breast, and cover the whole of the throat, are of a pure emerald green. In the male bird, there springs from each side of the chest a full plume, from sixteen to eighteen inches long, composed of slender shafts, with loose, delicate webs. In some specimens they are bright yellow at the base, fading gradually into straw-colour. From the tail-coverts spring two slender, naked shafts of great length, which taper gradually to a point, and are of a rich brown. The **Superb Bird of Paradise** (*Paradisea superba*) is somewhat smaller than that above described, and is chiefly distinguished by a double sort of ruff, composed of slender plumes that spring from the back of the neck. More of purple and blue enter into the plumage of this bird than the former. The **King Bird of Paradise** (*Paradisea regia*) is the smallest and the most precious of the family, both on account of its rarity and its splendid colours. It is scarcely as large as a sparrow. The upper parts of its body are of the richest chestnut-brown, and the under parts dazzling white. A zone of golden green extends across the chest ; from the sides spring two fan-like plumes, consisting of six or seven dusky feathers of the richest golden green. From the tail-coverts spring two long, slender shafts, each elegantly terminating in a broad emerald web, rising from one side only of the shaft, and disposed into a flat spiral curl. The breast and legs are yellowish-brown. These birds fly in flocks of about thirty or forty, led, it is said, by a single bird. They fly against the wind, lest their plumage should be discomposed. When flying, they make a noise like starlings ; but their common cry is little more melodious than that of the raven. They are captured by birdlime and blunted arrows. No pains are taken to preserve them alive : as soon as they are captured they are killed, embowelled, their feet cut off, the plumed skins impregnated with sulphur, and then dried for sale. The skin, to which a great part of the flesh is allowed to remain attached, is always much contracted by this drying process, and a very erroneous idea is sometimes formed of the size of the bird. With respect to their food, scarcely anything certain is known. Mr Shaw, drawing the inference from the strength of the beak and legs of some of these birds, thinks it likely that they prey on the smaller of the feathered tribe. Some naturalists assert that they live on fruits and berries ; and Linnæus, that they devour the larger butterflies. Bennett, in his "Wanderings," gives an account of one of those birds he saw in Mr Beale's aviary at Macao, where it had been confined nine years, giving no appearance of growing old. It ate insects in a living state, but would not touch them dead. When an insect was thrown into its cage, it contrived to catch it with great agility. It washed itself regularly twice a day, and after having performed its ablutions, threw its delicate feathers up over its head hood-wise. Its chief food during confinement was boiled rice and egg, with an occasional bit of plantain, and a grasshopper or other insect. The Zoological Society of London have just enriched their collection by two young males of the Lesser Bird of Paradise, (*Paradisea papuensis*,) brought from New Guinea in good health and fine condition. Another beautiful species is the **Incomparable Bird of Paradise**, (*Paradisea gularis*,) which is remarkable for a very long and broad tail. The whole body glows with a splendour almost metallic. Perhaps the most curious species is the **Golden Bird of Paradise**, (*Paradisea sexsetacea*,) which has six long filamentary feathers projecting from its head, each shaft having a little round patch of web at its tip. These curious feathers are movable at will, and give to their owner a wonderful diversity of expression. Its colour is velvet-black, with a gorget and collar of glittering golden-green. The **Red Bird of Paradise** (*Paradisea rubra*) is a lovely species. It derives its name from the tuft of carmine feathers that hangs over the tail, and from the prevalence of red throughout its plumage, orange and chocolate taking the place of yellow and brown.

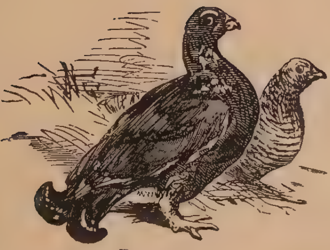
Birds, (Ang.-Sax.,) feathered vertebrated and oviparous bipeds, which are generally so constructed as to be able to support themselves in the air, and make progress through it. Every place in nature is furnished with its proper inhabitants. Both the land and the ocean are filled with living creatures, each of which is so constituted as to be especially adapted to the course of life through which it is to pass. The great realms of air have their special occupants—the birds, whose extreme beauty, variety, swiftness of motion, and buoyancy on the wing, are admired by all. Elegant and symmetrical as the outward form of the bird is, it is surpassed by the internal construction, which is peculiarly adapted to its habits and mode of living. The large head, broad shoulders, deep chest, and sinewy limbs of the quadruped, are replaced in birds by the pointed beak, the long supple neck, the gently-swelling shoulder, the expansive wings, the tapering tail, and the light, bony feet, all of which assist them in their motion through the atmosphere. Their bodies are protected from the intense cold in the air by a soft and delicate plumage, and their wings, although made of the lightest materials, are so powerful as to be able to strike the air with great force ; their tails also serve as rudders, steering them in any direction they please. Internally, the frame of a bird is quite as wonderfully and appropriately constructed. All the bones are thin and delicately formed, except the sternum, or breast-bone, which is very large and strong. The clavicles, or collar-bones, are generally joined, forming the bone called the merrythought, which, together with two bones called the coracoid bones, keep the shoulders apart, and serve to resist the compressing action of the wings. All the muscles, except the pectoral muscle, are small and light. In men and in quadrupeds, the pectoral muscles are small when compared with those of birds, which are very strong, and are situated on either side of the breast-bones. These muscles are used for moving the wings. The anterior extremities of birds are always wings, and never arms or legs. In the cases of birds whose wings are too small to enable them to fly, they are used either as paddles in the water or to assist them in running. The great auk is an instance of the former, and the ostrich of the latter. The lungs of a bird are situate close to the backbone and ribs. The air, entering them from the windpipe, passes through, and is conveyed to a number of membranous cells which lie upon the sides of the pericardium, and communicate with those of the sternum. These cells are in some birds continued down the wings, and even to the pinions and thighs, and other parts of the body. They can be filled with air at pleasure, and by this means the bird can render his body heavy or light, when necessary, either in flying, swimming, or running. The vertebral column in birds is usually rigid in the central parts and flexible at both extremities. By this means the ribs are strengthened, and the free motion of the neck and tail assisted. In birds which do not fly, the vertebræ retain some amount of motion throughout the back; but, in general, they become anchylosed, or firmly united and cemented together by bone. The skull differs from that of the mammalia; the cranial bones are consolidated, and there are no sutures in the skull of a bird. It is articulated to that part of the vertebral column called the neck by one condyle or joint, which is situated at the front margin of the great occipital opening, through which the brain descends into the vertebral column, being prolonged as it were into the spinal cord. It is by this peculiar formation that birds have so free a motion of the head and neck, especially in a horizontal direction. The wryneck is a special instance of this faculty; and many a youthful bird-nester has been scared from a wryneck's nest when he has seen her twist her head completely round, hissing all the time like a snake. Birds generally sleep with the head turned back and nestled under the wing. In mental capacity, birds fully equal quadrupeds, and in some respects, indeed, surpass them. In some of the songsters, the brain has been said to exceed that of man, when considered with reference to the comparative size of the head and body. The size of the brain of an eagle in relation to its body has been reckoned to be 1-260th part, that of a canary-bird 1-14th, and that of a man 1-22d to 1-33d part. Parrots and starlings retain many words and phrases fixed in their memories, and some singing-birds remember whole melodies. Birds of passage, after travelling thousands of miles, and after being absent for a great length of time, remember the exact spot where their nests were previously located, or where they were reared. Prudence, cunning, and docility, are practically exemplified in the different positions in which birds build their nests, some in the neighbourhood of human beings and some in uninhabited places. Sight, smell, and hearing, are the most acute senses in birds. There are two chief classes of birds,—the carnivorous and the granivorous; and there is a middle kind, as in quadrupeds, which partakes of the nature of both. The carnivorous class is provided with long wings, furnished with very powerful muscles, in order to be able to fly great distances. They have strong hooked beaks, and sharp formidable claws; they have large heads, short necks, and strong, sinewy limbs; their sight is wonderfully acute, so as to enable them to see their prey at a great height in the air; and they swoop down upon their victims with an unerring aim. Carnivorous birds are solitary and sullen, and seldom live together in flocks. Granivorous birds, whose food consists of grain of various sorts, have larger intestines than carnivorous birds, and their digestive organs are more complicated. The form of the bill varies according to the kind of food which the bird subsists on. (*See* BILL.) The food is passed from the bill into the stomach, which consists of three parts,—the crop, which lies in front of the breast-bone, the membranous stomach, and the gizzard. In the crop, the food undergoes a partial dilution from a fluid furnished by the glands. In the membranous stomach it is still further diluted, and then passes into the gizzard, which acts as a powerful mill, and in which the food is ground down and triturated. The action of the gizzard is strengthened by small hard stones, which many birds swallow with their food. The digestive powers of the gizzard are very extraordinary. An experiment was tried upon a turkey-cock, when a ball of lead, studded with twelve small lancets, was forced down his throat. After eight hours had passed, the gizzard was opened, and the ball was found by itself, the whole of the lancets being broken to pieces. In the London museum of the College of Surgeons there is a large bottle entirely filled with pebbles, &c., taken from the stomach of an ostrich. In some experiments tried upon a hen, it was found that a louis d'or, after being swallowed for four days, lost sixteen grains; and the weight of an onyx was diminished one-fourth. In carnivorous birds the muscles connected with the gizzard are very weak. The liver of domestic birds is much larger than that of wild birds. It is considered a delicacy among gourmands; and *pâtés de foie gras* are made from the enlarged livers of geese. The eyes of birds are admirably adapted for sight. The impression of external objects is rendered more vivid and distinct by a particular modification of the optic nerve. They have three eyelids, two of which, the upper and lower, are closed in most species by the elevation of the lower one. This may be noticed in domestic fowls. A small number of birds, such as the owl and goat-sucker, can depress the upper eyelid. The third eyelid, a thin semi-transparent membrane, lies, when at rest, in the inner corner of the eye, with its loose edge nearly vertical. It can be drawn over the eye like a curtain; and by its means the eagle is said to be able to look at the sun. Were the eyes of birds less perfectly formed, on account of the rapidity of their flight they would be liable to strike against any object in their way. The voices of birds distinguish them from all the rest of the animal world. The organs of the voice closely resemble certain musical instruments. At the bifurcation of the windpipe is a glottis furnished with appropriate muscles, where the voice is formed. The gift of song is only possessed by male birds, and their notes are generally expressive of love. They are silent when in ill health, in sadness, or during rough weather; but when they are cheerful they always sing. They express different feelings with varied modulation; and the fear of approaching danger, hunger, love, longing for their mates, &c., are all expressed by changes in the tone of the song. This faculty is possessed by no other animal. Every form which the most lively fancy could create, and every hue that the imagination could conceive, are to be found in the feathers of birds. Two changes occur in the feathers,—one in the spring and another in the autumn. In the former case, the change occurs just before the breeding-time, and the bird gains a number of new feathers without losing the old ones. In the latter, or moulting season, the old feathers fall off and new ones appear. The feathers of the wings are larger and stronger than those on other parts of the body. They are called wing-feathers, quill-feathers, or quills. At the base of each quill are small feathers called wing-coverts. The tail-feathers are also provided

BITTERN.

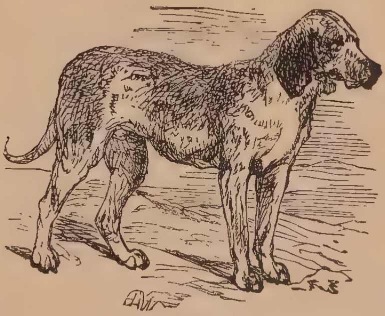
BOATBILL.



BLESSBOK (Damalis Albifrons.)



BLACKCOCK.



BLOODHOUND.

with coverts above and below. Many birds have very ornamental plumage in their tails; and the feathers often take other remarkable forms in different parts of the body; such as shoulder-tufts, ruffs, crests, &c. When spring approaches, wild birds begin to pair and to make arrangements for their young. The notes of the male bird at this time are very loud; and the marriage contract then entered into is for the season faithfully adhered to. In case one of the pair dies, its mate soon finds another spouse. The reproduction of the species among birds is carried on by means of eggs, which pass from the body of the female and are afterwards hatched. The warmth necessary for incubation is usually derived from the body of the bird, which sits upon the eggs. This duty is generally performed by the female bird; but in some cases it is undertaken by the male. (*See* EGG, HATCHING, REPRODUCTION.) Many sea-fowl make no nests, but deposit their eggs on the bare rock, or in rough holes scratched out of the earth or sand. The ostrich allows her eggs to be hatched by the heat of the sun in warm climates; but she sits and broods over them where the temperature is colder. Birds generally brood once in the year, but some brood twice; and the number of eggs they lay varies from one to twenty. The cuckoo and a small number of other birds lay their eggs in the nests of other birds, in order to be hatched by them; and several birds are able to run about and find food as soon as they leave the nest, while others remain in the nest for days and weeks before they can venture out. During this period the parent birds find food for them. At the breeding-season birds are often gregarious, and sometimes live together in one large nest. Birds' nests are constructed with such delicate and exquisite art and ingenuity, as to call forth the admiration of every observer. Birds of the same species, wherever they may be found, build their nests with the same kind of materials and in the same manner. The situations they select, the materials they use, and the form in which they build, are wonderfully adapted to the particular nature and necessities of the bird. They are generally lined with moss, wool, fine hair, or down, and have an exterior composed of straws, twigs or roots, and dry grass, mixed with clay. Birds that build early in the spring, such as the blackbird and thrush, line their nests with loam, in order to keep out the cold air. The common sparrow, who builds four or five nests in the year, is not particular as to the situation he chooses. Sometimes he locates himself in ivy, sometimes in trees and hedges, and often under the eaves of houses. Some birds carefully conceal their nests, and some leave them open and apparent; some, like the jay, build them so loosely that the eggs can be seen through the twigs; and some very compactly, such as the golden-crested wren, which constructs its nest with small pieces of moss and spiders' web interweaved. It is nearly an inch in thickness, and is lined with a profusion of soft downy feathers. While hatching, all birds, as a general rule, resort to those places where their particular food is plentiful, and where there is an abundance of the proper material with which to construct their nests. Some water-fowls pluck the down from their own breasts, in order to line their dwellings; but they usually build in out-of-the-way places, since their food is not that which is gathered by ordinary birds. While hatching, the female bird is remarkably patient. She is usually plump when she begins to sit; but before the eggs are hatched she is almost reduced to a skeleton. Neither hunger nor danger will make her leave her post of duty; but if, after being absent, the male and female birds perceive that their nest has been meddled with, they will often leave, and build in a securer place. After the young are fledged and flown, the nest is generally deserted. Many small birds live upon worms, caterpillars, &c.; and it has been remarked, "that a single pair of sparrows, during the time they are feeding their young, will destroy about four thousand caterpillars weekly: they likewise feed their young with butterflies and other winged insects, each of which, if not destroyed in this manner, would be productive of many thousands of caterpillars." The sparrow is usually believed to be the gardener's enemy; but this would seem to show the reverse. Whilst moulting or changing their feathers, many birds turn sickly, and often die. Every country and climate have birds which are peculiar to them; but many migrate to distant lands when the season becomes too severe for them. Near the equator the birds are remarkable for their brilliant and varied plumage; but their voices are usually harsh and discordant. In the frigid zone, where fish is plentiful, they are mostly aquatic, and their plumage consists of soft, warm, downy feathers. In all countries, birds live longer, comparatively, than either men or quadrupeds in the same place. Many kinds of birds are important in an economical sense. A large profit is derived from the rearing of domestic fowls; and the flesh and eggs of most birds can be eaten. The flesh of fish-eating birds and birds of prey is considered unpleasant. Feathers are employed in many useful and ornamental ways, and the dung of birds is useful for manure. (*See* GUANO.) From the earliest periods birds have been objects of interest. Amongst the ancient Romans and Greeks, their habits and customs were not only well known to the husbandmen and augurs, but even to the general mass of people. Several poets refer to them as the harbingers of various seasons; and the title of one of the plays of Aristophanes is "The Birds." Aristotle, in his History of Animals, describes the classes and habits of birds accurately and philosophically; and in Pliny's Natural History the subject is also treated in a very learned manner. Pierre Belon, in 1555, was the first zoologist of note who wrote upon the subject of birds in later times. He placed the rapacious birds first, the waders second, the swimmers third, and the birds which build their nests in trees or on the ground fourth. About forty years afterwards, Aldrovandus of Bologna produced his work called "Ornithology." He followed the same arrangement as Belon, and added many new particulars of the habits and haunts of the several birds described. Francis Willughby, an English gentleman, was the first naturalist in modern times who reduced ornithology to a system. His "System of Ornithology," edited by Ray, the celebrated Cambridge professor, is a work of great merit. In it, birds are divided into two general classes,—"land birds" and "water birds." The former are divided into those which have crooked and those which have straight beaks and talons; the latter are divided into three sections,—first, the waders; secondly, those which are of "a middle nature between swimmers and waders, or, rather, that partake of both kinds, some whereof are cloven-footed, and yet swim, others whole-footed, but yet very long-legged, like the waders." The third class of water-birds consisted of palmated birds, or swimmers. Ray's edition of Willughby was again revised and edited by Dr Derham in 1713; and upon the works of these three naturalists Linnæus formed his ornithological system; and the orders in his class *Aves* are as follows:—

1. *Accipitres.*—Birds of prey, properly so called.
2. *Picæ.*—Woodpeckers, crows, humming-birds, kingfishers, &c.
3. *Anseres.*—Swimmers.
4. *Grallæ.*—Waders.
5. *Gallinæ.*—Gallinaceous birds; such as grouse, partridges, and domestic fowls.
6. *Passeres.*—Sparrows, swallows, finches, doves, thrushes, &c.

In the year 1760 Brisson introduced his system, in which birds were divided into two classes,—those whose toes were furnished with membranes through their entire length, and those whose toes were without membranes. Buffon published his work upon birds in 1770, and Scopoli another in 1771. Cuvier, in 1817, published a new method, dividing birds into six classes, at the same time expressing an opinion that all the systems he had seen were wrong. At the present day, it is also true that a correct arrangement has not yet been made. About 5000 species of birds are known to exist; and the Dodo is a remarkable instance of a genus of birds which has recently become extinct. (*See* DODO.) Under the title ANIMAL KINGDOM, in Class II. of the sub-kingdom *Vertebrata*, will be found one of the best modern arrangements. Amongst the most celebrated writers on the natural history of birds in Britain may be numbered Pennant, Lewin, White of Selborne, Bewick, Montagu, Donovan, Selby, Mudie, Macgillivray, Thompson, Meyer, and others. In America and the West Indies the principal authors in ornithology have been Hernandez, Marcgrave, De Azara, Sloane, Catesby, Vieillot, Wilson, Spix, C. L. Bonaparte (prince of Canino), Audubon, Richardson, Swainson, and Nuttall; while the birds of Europe have been learnedly treated of by Temminck, Meyer, and Wolff. Gould has written several valuable works, not only upon the birds of Europe, but upon the birds of Australia, the humming-bird, the toucan, &c. Several other illustrious authors have distinguished themselves in their works upon ornithology; amongst whom may be mentioned Buffon, Cuvier, Illiger, Strickland, Syme, and Yarrell. (*See* ORNITHOLOGY.)

BIRD'S-NESTS, EDIBLE, the nests of four species of swallow, belonging to the genus Collocalia, which are considered a delicacy, and are frequently mixed among soups. On the sea-coasts of China and in Java, at certain seasons of the year, vast numbers of these birds are seen. At their breeding-time they leave the inland country to build in the rocks. They construct their nests out of a substance which they find upon the shore. This gelatinous matter is supposed by Kempfer to be mollusca or sea-worms; according to M. Le Poivre it is fish-spawn; and according to Linnæus, a kind of medusa or jelly-fish, called by fishermen *blubbers* or *jellies*. The nests are of a hemispherical shape, and about the size of a goose's egg; and in substance bear a strong resemblance to ichthyocolla or isinglass. They are gathered by the Chinese, and sent to all parts of the world, and are esteemed a great luxury. Mr Marsden found great quantities of these nests in the island of Sumatra, particularly about Croe. A large cave, situated four miles up the river of that name, contains vast numbers. The white nests are more valuable than the black, being found in the proportion of only one to twenty-five. Marsden says:—"The white sort sell in China at the rate of 1000 to 1500 Spanish dollars the pecul; the black is usually disposed of in Batavia for about twenty dollars the same weight, where it is chiefly converted into glue, of which it makes a very superior kind." The same authority considers that the difference of colour is owing to the mixture of feathers with the viscous substance of which the nests are formed; and deduces that opinion from the experiment of steeping the black nests for a short time in hot water, when they are said to become in a great degree white. When the natives take the nests, they enter the cave with torches, and by means of a ladder, made of a single bamboo notched, ascend and pull down the nests, which adhere in numbers together, from the side and top of the rock. The more regularly and frequently the cave is stripped, the larger the proportion of white nests found. On this experience, the natives destroy the old nests, that they may find white ones in their stead at their next search.—*Ref.* Count Hogendorp's *Coup d'Œil sur l'Ile de Java*; and Crawfurd's *Eastern Archipelago*.

BIRDS OF PASSAGE are those birds which migrate from one country to another at certain times, depending on the seasons. Availing themselves of their power of flying, many birds remove themselves, at certain periods of the year, to places where the temperature is more congenial, and the supply of food more abundant. Even in the tropics, some birds, like the bird of paradise, migrate from island to island, according to the change of seasons from the dry to the wet monsoon. In the temperate and colder regions, however, birds of passage usually migrate from south to north or from north to south, as winter passes into summer or summer into winter. They are usually divided into two classes,—winter and summer birds of passage, the term being applied according to the time when they make their appearance. Hence the summer birds of passage in one country are the winter birds of passage in another. The approach of spring is always heralded by the arrival of summer birds of passage, and their appearance is always connected with pleasant and cheerful associations. During the winter season large numbers of winter birds of passage, such as wild swans, geese, and other water-fowls, leave the frozen waters of the north and migrate to the shores of Great Britain. Woodcocks, fieldfares, redwings, and many other birds which breed in northern countries, also make their appearance regularly. The migrations of the pigeons in America are very extraordinary, on account of the vast numbers which compose the flocks. The return of some birds of passage can be depended on almost to a single day; and in some places, such as St Kilda, where the inhabitants used to depend for their existence on the sea-fowl, their return is almost punctually on the same date. It has been observed that some birds of passage leave at the regular time, while others seem dependent upon the weather and temperature. Nearly all birds of this kind have long and powerful wings; but some are short-winged. They can pass over great distances in a very short period of time; and as they can fly with ease at the rate of 50 to 150 miles an hour, they often arrive at their destination with comparative ease; but some birds, such as the woodcock, are often found much exhausted after their flight. That birds of passage return to the same places which they formerly inhabited, has been clearly proved in the case of swallows. At one time it was believed by many ornithologists that swallows hibernated; but this opinion has latterly been completely overthrown, and their annual migrations have been completely ascertained. The subject of the migration of birds is very interesting when taken in reference to the instinct which guides them. When a bird of passage is confined in a cage, or otherwise, it shows great inquietude and restlessness whenever the time of migration arrives.

Birds of Prey, a term usually employed to distinguish the order of birds called *Accipitres* by Linnæus. They have remarkably keen sight, and great perfection in the sense of smell. Many birds, however, which follow and prey upon other birds, do not belong to this order; and those which live upon fishes, worms, and insects, are not reckoned as birds of prey. There are two sections into which birds of prey are divided—the diurnal and the nocturnal; the latter division is composed entirely of owls.

Bison, *bi'-son*, (Lat.) (*Bison Bonassus*,) properly called the **Aurochs**, this name being a corruption of **Auer-ochs**.—The principal European regions where this animal is found are the marshy forests of Poland, the Carpathian mountains, and Lithuania. Its chief abiding place in Asia is in the neighbourhood of Mount Caucasus. It is as large as an English bull, but looks much larger, on account of its wealth of shaggy hair, and is ten times as formidable, because of its tremendous strength and intense ferocity. Its head is small; its horns short, sharp, and strong; and its eyes red and fiery. The colour of its hide is rufous-brown It is remarkable for giving out a very powerful musky odour, which is stronger in the male than in the female. The height at the shoulder is about six feet. The **American Bison**, (*Bison americanus*,) commonly called the American buffalo, is larger, shaggier, and fiercer even than the European species. The hair about its neck and shoulders is bushier, and of a fine texture. The hump, which is oblong, diminishes in height towards the tail, lending a considerable obliquity to the outline of the back. On the crown of the head the hair rises in an immense mass, and shows in thick close curls before the horns; below the chin the hair grows like a beard, and falls as low as the knees. According to Catlin, and other travellers in North America, this maned buffalo affords not only food, but every creature-comfort to *three hundred thousand* people. Its flesh is their meat; its skin serves them for coats, and beds, and boots, and walls for their tents, and tiles for the roof, and for saddles, and bridles, and lassos. The bones are converted into saddle-trees, into war-clubs, into whistles, and into musical instruments. Of the horns are made pins, needles, ladles, spoons, and spear-heads; the sinews serve as strings to their bows, thread to stitch their buffalo robes and to form their tent-cloths, and for the attachment to their persons of scalps and such pleasing nic-nacs as they may set store by. The bison's feet and hoofs, when stewed down, yield a superior glue, largely used in the construction of hunting spears and arrows. The mane of the animal is twisted into ropes and horse-halters, and the tuft at the extremity of its tail is used as a fly-brush. The brains even are not wasted, but used in the preparation of leather from the bison's hide. The number of bisons roaming the vast North American prairies is said to grow less year by year; still herds consisting of thousands exist at the present writing. During the pairing season the roaring of the bulls is terrific, and the combats that take place between them are unequalled even among the carnivora. They swim broad rivers in nearly the same order as they traverse plains, viz., in a dense animated mass, pressing so close at each other's heels that the foremost dare not stop from peril of being trodden to death. The Indians profit by this peculiarity, and, creeping up to a herd, drive them forward with hideous shouts and yells, to the verge of a precipice, over which a score or so will certainly topple.

Bismore, *biz'-more*, popular name for the fifteen-spined stickleback.

Bittern, *bit'-tern*, (Du. *butoor*,) (*Botaurus stellaris*.)—This bird is generally found throughout the entire Eastern hemisphere. In summer it chiefly affects the north of Europe and Siberia, at other seasons the mild regions skirting the Mediterranean, in China, India, and even in Southern Africa. It was formerly plentiful in this country; but the universal drainage of marsh land has driven it to seek a locality more congenial to its nature. When alarmed, the bittern emits a peculiar cry, by no means pleasant to hear; but on the approach of the breeding season the sounds it utters are of the most hollow and melancholy kind. The provincial English names are "Meredrum," "Butterbump," "Night-raven," and "Bull of the Bog." "Most, if not all the birds of the heron genus, especially our common heron, have on their breasts a considerable space void of feathers, filled up by tufts of down, to which adheres a sort of clammy oily substance. It is not, therefore, unlikely that this oily matter may, either by smoothing the water or in some other way, enable the bird to attract, or, when attracted, to strike its prey with greater certainty."—Stanley's *History of Birds*. The length of the common bittern is about thirty inches, and its voracity remarkable. Mr Yarrel found in the stomach of one the bones of a good-sized pike.

Bivalve, *bi'-valv*, (Lat. *bis*, double; *valvæ*, valves,) in Conch., a term given to those kinds of shell-fish which possess two shells, in contradistinction to those which possess but one, and which are termed univalve. (*See* **Mollusca**.) As familiar examples of bivalves, may be mentioned the mussel, cockle, and oyster. Bivalve shells form the testaceous envelope of molluscs, and are composed of two concave plates connected by a hinge, having an elastic ligament.

Black Ant. (*See* Ant.)

Black Beetle, *be'-tel,* (*Blatta orientalis,*) a popular misnomer for the cockroach. These insects, though now common throughout Europe, are supposed to have been originally natives of India, and, by the progress of commerce, carried thence westward. On board merchant ships the black-beetle is very commonly found; and it is said to be more plentiful in seaport towns than other places. Their habits are too unpleasantly familiar to us all to need description here. All sorts of matter, vegetable or animal, suits the appetite of these insects. The curious way in which insects of this genus lay their eggs is worth mention. Instead of emerging singly from the abdomen of the female, they are enclosed in a horny case almost half as large as the abdomen of the parent. Within this the eggs are ranged in two rows, separated by a partition which runs down the middle of the case; each egg is also separated from the next by a similar partition. This egg-case is attached to the wall or floor with a strong adhesive liquid furnished by the mother. When the larvæ are hatched, they emit from their mouths a fluid which dissolves the walls of their prison, and they are set free. The extrusion of the ponderous egg-case is sometimes a difficult matter with the mother; and she may be sometimes seen labouring about, and presenting the disagreeable appearance of having been cruelly maimed.

Blackbird, *blak'-bird,* (*Turdus merula.*)—This familiar bird furnishes a fair example of the general size and appearance of the typical thrushes. Like the corvine or crow family—of which, indeed, the thrushes are but representatives—these birds make their way upon the ground, in the air, and among trees, with equal facility; and this perfection of foot is more or less prevalent throughout the family. It builds a large cup-shaped nest, composed of grass, roots, and stems externally, coated inside with mud, and lined with soft grasses. It lays five eggs, generally of a mottled gray and blue.

Blackbird-Savannah, (*Crotophaga ani,*) an American bird, belonging to the anis. It is an insect eater, and is useful to oxen, freeing them from the insects that sting them and the grubs that burrow into their hides. It is a greenish black, about the size of a pigeon.

Blackcock, *blăk'-kok,* (*Tetrao tetrix,*) a species of the grouse family, rarely seen in England, but abundant in Scotland. In its habits the blackcock closely resembles the capercalzie, inhabiting the low-lying districts, and feeding chiefly on the young shoots of shrubs, and seeds, and berries. According to Yarrell, in the winter time the bird's crop is frequently found filled with the young shoots of fir.

Blackfish, a popular name for one of the Physeter whales. It is a large creature, reaching fifty or sixty feet in length, and having a wonderfully large head, exceeding in length one fourth of the animal. (*See* Physeter.)

Bladder, *blăd'-der,* (Sax. *blader,* from *blawan,* to blow,) in Anat., is a thin membranous bag, which serves as a receptacle for the urine secreted by the kidneys, until it is voided through the urethra. It is situated in the pelvis, and is kept in its place by ligaments, which are usually divided into true and false, the latter being formed of folds of the peritoneum. It is composed of three coats or membranes,—the external or fibrous membrane, the middle or muscular membrane, and the internal or mucous membrane. Its figure is nearly that of a short oval. It is broader on the fore and back than on the lateral parts; rounder above than below when empty; and broader below than above when full. It is divided by anatomists into the fundus or upper portion, the body, and the neck—that portion which is constricted by a sphincter muscle, and communicates with the urethra. On each side, rather below its middle, it receives the two ducts called ureters, which convey the urine from the kidneys into the bladder. The bladder, like every other organ of the body, is liable to certain diseases, one of the most common of which is inflammation, or cystitis. It chiefly affects the mucous coat of the bladder; but all the other coats may be implicated; and it is either chronic or acute. The acute form is known by great pain in the region of the bladder, attended with fever and hard pulse, and a frequent and painful discharge of urine, or a retention. The disease runs its course with rapidity, and subsides, or carries off the patient in a few days. It is to be treated by local bleeding and hot fomentations, together with opiates. The chronic form of this disease is best treated by tonics and sedatives. The causes of this disease are various. It often arises from calcareous secretions, which in that case must be removed. (*See* Lithotomy.) Irritability may exist in the bladder unaccompanied by inflammation, and may arise from over-distension or from nervousness. It is to be treated by the administration of tonics. The bladder may be affected with paralysis, resulting either from accident, from disease of the nervous centres, or from over-distension. It gives rise to incontinence of urine, which, however, is to be distinguished from that which sometimes arises from irritability, inasmuch as in this case the bladder is full, and has no power to evacuate; so that it must be drawn off by the catheter. Retention of urine may be caused by mechanical obstacles to its exit, by paralysis, or by a want of power over the muscles.

Blaps, *blăps,* in Ent., the typical genus of the family Blapsidæ, of that order of insects named Coleoptera. The blaps is the only insect of the family Blapsidæ to be met with in this country. Its scientific name is *Blaps mortisaga,* its common one the Churchyard Beetle. It is of moderate size, sometimes of a dark, but more frequently of a black colour, and is generally to be found in murky, damp situations, or the dirty parts of dwelling-houses. Mr Westwood makes the following extraordinary statement with regard to these insects:—"Several instances have been noticed in which the larvæ have been discharged from the stomach. Of these the most remarkable account is that published by Dr Pickells in the Transactions of the Associated Physicians in Ireland, of a case of a woman, aged 28, who emitted as many as two thousand larvæ of this insect at various times, as well as one pupa and one imago; and which probably originated in an absurd and superstitious practice which she had for some time followed of drinking daily, for a certain time, a quanti of water mixed with clay taken from the graves of two Catholic priests, and eating large pieces of chalk. One of these beetles was immersed repeatedly into spirits of wine, but revived after remaining therein all night, and afterwards lived three years." Fabricius states that the women in Egypt eat the *Blaps sulcata* cooked with butter, in order to attain that corpulent condition of body so highly esteemed as an element of female beauty by the Orientals.

BLATTIDÆ, *blăt'-ti-de*, (Lat. *blatta*, an insect that eats away clothes,) a family of insects belonging to the order Orthoptera. The insects of this family are extremely active and voracious. According to Mr Stephens, there are only seven species indigenous to this country, among the most disagreeable of which is the well-known cockroach or black beetle. (*See* BLACK BEETLE.) In hot climates, where the number of species of this family is very large, their ravages are exceedingly great. The largest of the genus is the *Blatta gigantea* of Linnæus, which is indigenous to the warmer parts of Asia, South America, and Africa, where "they plunder and erode all kinds of victuals, dressed and undressed, and damage all sorts of clothes, especially such as are touched with powder, pomatum, and similar substances; everything made of leather, books, paper, and various other articles, which, if they do not destroy, at least they soil, as they frequently deposit a drop of their excrement where they settle, and some way or other by that means damage what they cannot devour. They fly into the flame of candles, and sometimes into the dishes; are very fond of ink and of oil, into which they are apt to fall and perish; in which case they soon turn most offensively putrid; so that a man might as well sit over the cadaverous body of a large animal, as write with the ink in which they have died. They often fly into persons' faces or bosoms; and their legs being armed with sharp spikes, the pricking excites a sudden horror not easily described. In old houses they swarm by myriads, making every part filthy beyond description, wherever they harbour, which, in the daytime, is in dark corners, behind clothes, in trunks, boxes, and, in short, every place where they can lie concealed. In old timber and deal houses, when the family is retired at night to sleep, this insect, among other disagreeable properties, has the power of making a noise which very much resembles a pretty smart knocking with the knuckle upon the wainscoting. The *Blatta gigantea*, in the West Indies, is therefore frequently known by the name of the Drummer. Three or four of these noisy creatures will sometimes be impelled to answer one another, and cause such a drumming noise that none but those who are very good sleepers can rest for them. What is most disagreeable, those who have not gauze curtains are sometimes attacked by them in their sleep; the sick and dying have their extremities attacked, and the ends of the toes and fingers of the dead are frequently stripped both of the skin and flesh." The *Blatta americana*, or American cockroach, is another member of this troublesome family. Its size is somewhat larger than that of the black beetle, but its destructive powers are little less. It is now becoming common in England, especially in seaport towns, where it is brought with merchandise from abroad. The *Blatta lapponica* is a smaller species, which is to be found in Lapland in great numbers. When very numerous, instances have been known where they have devoured the whole of the natives' winter provision of dried fish.

BLEAK, *bleek*, (*Leuciscus alburnus*,) a little silvery-scaled fish, well known to British anglers. It is said that the scales of the bleak are used in the manufacture of imitation pearls.

BLENHEIM SPANIEL. (*See* SPANIEL.)

BLENNIUS, *blen'-ni-us*, (Gr. *blenna*, mucus,) a genus of fishes belonging to the section Acanthopterygii and the family Gobidæ. The fishes of this genus are principally recognisable from their having the ventral fin placed before the pectoral. They congregate in small shoals upon rocky coasts, where upon the reflux of the tide, they may be often found in pools among the crevices of the rocks. Mr Yarrell states that five species frequent the English coasts. These are,—Montagu's, or the Diminutive Blenny; the Ocellated Blenny, or Butterfly-fish; the Gattoruginous Blenny; the Shanny; and the Crested, or Yarrell's Blenny.

BLEPSIAS, *blĕp'-sĭ-as*, a genus of acanthopterygian fishes. The jaws are very large, and in the three-sided blepsias, the spinous parts of the dorsal fin are so deeply notched as to divide the whole fin into three parts. A number of appendages hang from the jaw. These fishes are found off Kamtschatka.

BLESBOK, *bles'-bok*, (*Damalis albifrons*,) a fleet antelope of Southern Africa. The name is a corruption of Blaze-buck, from the "blaze," a white patch upon the face.

BLINDWORM, a small lizard belonging to the family Anguidæ. There is a great variety of the species in Europe, and one of the genus is well known in many parts of Britain. It is perfectly harmless, and in no species are there any poison-fangs. Its teeth are very small, and, when irritated, it attempts to bite, but is unable to pierce the skin. Its eyes are very small, though round and brilliant, and in consequence it is believed to be blind by the ignorant; hence the name. The blindworm lives in holes in rocks, under stones, &c.; and feeds almost wholly upon the smaller slugs. It will not touch them when it finds them dead. Its length varies from 11 to 15 inches, and its thickness is equal throughout its length. Its colour is silvery gray, with a black line along the back. The body is singularly brittle; the tail is easily broken off, but soon sprouts out afresh, and at the end of a year is quite renewed. The blindworm or *slow-worm*, as it is often called, remains torpid during the winter, and casts its skin at the beginning of summer. It is ovoviviparous, and the number of young varies from seven to twelve at a birth. One of the most interesting facts in connexion with the blindworm is, that it forms one of the connecting links between lizards and serpents. The bones of the head of a blindworm connect it with the lizard family; and although there are no external traces of limbs in the skeleton, there are the bones of the shoulder, the sternum or breast bone, and the pelvis, all existing in a rudimentary state.

BLISTER-FLY, or CANTHARIS, (*Lytta vesicatoria*,) an insect common to the south of Europe. Its body is used for medicinal purposes, having the effect of raising a blister when applied to the skin. It has been observed that the efficacy of the insect increases according to the heat of the country inhabited by it.

Blood, *blud*, (Sax. *blod ;* Germ. *blut ;* Lat. *sanguis*,) a red fluid circulating through the heart, arteries, and veins of animal bodies, serving for the nourishment of all their parts, and the support of life. This nutritive fluid, called scientifically the *liquor sanguinis*, consists firstly of water, holding, in a dissolved condition, fibrin, albumen, potassium, and sodium, together with phosphoric acid and other substances; secondly, of corpuscles, or globules, which float in the *liquor sanguinis*. When drawn from the body, the blood undergoes a remarkable change. By degrees it gelatinises, and forms spontaneously coagulum and serum. Coagulum consists of the fibrin and the corpuscles; serum, of water, albumen, and the various saline matters. The corpuscles are of two kinds—red and white, the red being the more numerous. In man, a red corpuscle varies in size from 1-400th of an inch to 1-2800th of an inch. The discovery of the globules of the blood is due to Leuwenhoeck and Malpighi, whose researches were made soon after the microscope was invented. Blood is termed arterial or venous, according to the vessel in which it circulates. Arterial blood is a florid red, with a stronger odour and less specific gravity than the venous fluid. Venous blood is of a dark purple. The scarlet or arterial blood, which is one degree warmer than venous blood, owes its colour to its undergoing contact with atmospheric air in the lungs; it circulates in the pulmonary veins, the left cavities of the heart, and the arteries, by which it is distributed to the different organs throughout the body. The dark purple blood circulates in the veins, in the right cavities of the heart, and the lungs. (*See* Circulation of the Blood, Respiration.) There is, again, a difference between arterial and venous blood in respect to the gases which they contain; the first holds a supply of oxygen, the second is rendered impure by the carbonic acid with which it is loaded. (*See* Artery and Vein.) Blood is the product of the elaboration of chyle; it acquires all its nutritive and life-giving qualities in respiration. By means of the arterial vessels, it penetrates to all the organs, distributing nutrition to every organic tissue. It is, moreover, the principal source of animal heat; from it, also, the secretive organs derive their various products, such as saliva, bile, urine, &c. The average quantity of blood in an adult man has been calculated at 28 lbs. or pints. It has been shown that the composition of the blood undergoes a change in various diseases; and, after repeated bleedings, the number of corpuscles becomes permanently diminished. The colour, as well as the composition of the blood, varies in different sections of the animal kingdom: red in the vertebrates and annelides, it is white and transparent as water in insects and crustaceans; bluish-white in mollusca, yellowish in holothurians and some other invertebrates. This difference in colour arises from the corpuscles, which are red in some cases, and in others white or straw-coloured, or bluish-white. The temperature of the blood of various animals, according to the researches of Rudolphi and Tiedemann, is—

	Deg. of Fahrenheit.
Great Titmouse	111·25
Swallow	111·25
Ducks and Geese	106 to 111
Common Hen	102 to 109
Eagles, Hawks, &c.	104 to 107
Pigeon	106 to 109
Gull	100
Bat	106
Squirrel	105
Ox	104
Ape	103
Dog	101
Cat	98 to 103
Elephant	99
Horse	98·24
Man	98

The chemical constituents of blood, when in a healthy condition, are,—albumen, fibrin, hæmatin or colouring matter, oleic, stearic, lactic, phosphoric, sulphuric, and hydrochloric acids, in combination with soda, potash, ammonia, lime, magnesia, and a small portion of phosphorised fat. The blood also contains oxygen, nitrogen, and carbonic acid. In considering the chemical constitution of the blood, it may be regarded as consisting of two parts,—the *liquor sanguinis*, and the blood corpuscles floating therein. The *liquor sanguinis* is composed of serum, holding a small quantity of fibrin in solution. The following table of the composition of these two parts of the blood is based on the analyses of Schmidt and Lehmann, and is a modification of that quoted in Miller's *Elements of Chemistry*, vol. iii. p. 689 :—

Specific gravity of blood corpuscles, 1·0885.

Composition of Blood Corpuscles.

Water	688
Solid constituents—	
Hæmatin	16·75
Globulin and cell membrane	282·22
Fat	2·31
Extractive matter	2·60
Chlorine	1·686
Sulphuric acid	0·066
Phosphoric acid	1·134
Potassium	3·328
Sodium	1·052
Oxygen	0·667
Phosphate of lime	0·114
Phosphate of magnesia	0·073

Specific gravity of liquor sanguinis, 1·028.

Composition of Liquor Sanguinis.

Water	902·90
Fibrin	4·05
Albumen	78·84
Fat	1·72
Extractive matters	3·94
Chlorine	3·644
Sulphuric acid	0·115
Phosphoric acid	0·191
Potassium	0·323
Sodium	3·341
Oxygen	0·403
Phosphate of lime	0·311
Phosphate of magnesia	0·222

Taking the blood as a whole, Liebig gives its component parts as follows :—

Water	80
Solid matter	20

The solid matter, on being incinerated, gives 1¼ to 1½ per cent. of ash, which consists of one-half sea-salt, one-tenth of peroxide of iron, and the rest of lime, magnesia, potash, soda, phosphoric acid, and carbonic acid. (For a description of the chemical substances obtained from blood, *see* HÆMATIN, HÆMATOIDIN, and GLOBULIN.)—*Ref.* Todd's *Cyclopædia of Anatomy and Physiology ; English Cyclopædia* —Arts and Sciences.

BLOODHOUND, *blud'-hound*, (blood ; and Dan. *hund*, hound,) (*Canis domesticus ;* var. *sanguinarius*,) a dog of such exquisite and peculiar scent as to be able to follow the trail, for many miles, of any body bearing about it traces of fresh-shed blood. The genuine bloodhounds are large, strong, and broad-chested ; the upper lip large and pendulous ; the general colour a deep tan, marked with a spot of black over each eye. Formerly this creature was used in recovering escaped criminals. Such matters, at least in England, have become traditions of a past age, and the instincts of the bloodhound have been turned to the more humane and profitable business of the chase.

BLOW-FLY, *blo'-fli*, (Ang.-Sax.,) (*Sarcophaga carnaria ;* Gr. *sarx*, flesh, *phago*, I eat,) a dipterous, or two-winged insect, of the family Muscides, of which the common house-fly is the most familiar example. The blow-fly, which is very common in Britain on heaths, in gardens, &c., has a hairy body, with wings that have an expanse of an inch. The face is yellow, the thorax gray with three small stripes, and the abdomen is dark brown, which in certain lights has a blue tinge, and is covered with shining yellow spots. The eyes are always widely separated in both sexes. The larvæ of the blow-fly feed upon the flesh of animals, either living or dead. Sometimes they are found in meat, the carcases of dead animals, the bodies of living earthworms, and very often upon sheep. The maggots eat their way into the skin of the sheep, which soon die, after suffering great torment. Some parts of England are more infested with these pests than others, and their appearance requires the most untiring attention of the shepherd. Many blow-flies are ovoviviparous, the eggs being hatched within the body of the insect, and their reproduction is very rapid. There is a particular species of this group which haunts burial-vaults : it is called *Sarcophaga mortua*.

BLUBBER, *blub'-ber*, (Ang.-Sax.,) the fat of whales and other large sea-animals. Properly speaking, it is the *adeps* of the animal, and lies immediately beneath the skin and over the muscular flesh. In the porpoise it is a firm and fibrous mass, usually about an inch thick ; in the whale its thickness is generally six inches : about the under lip it is two or three feet thick. The quantity of blubber yielded by one of these animals is generally from twenty to thirty tons, from which from fifteen to twenty-two tons of oil may usually be extracted. The use of the blubber to the animal seems to be partly to poise the body, and render it equiponderant to the water, partly to keep the water at some distance from the blood, and so prevent chill, and partly to act as a non-conductor, and so redouble the heat ; since all fat bodies are less sensible of cold than lean ones.

BLUE-BIRD, (*Sialia sialis*,) an American bird, closely resembling in its habits the English robin.

BLUEBOTTLE-FLY. (*See* FLESH-FLY.)

BLUE-BREAST, (*Motacilla suecica*,) one of the English names of a pretty bird which forms the link between the redstart and the lapwing. It resembles both birds closely, and is sometimes called the blue-throated robin, and sometimes the blue-throated redstart. The blue-breast is found in the same countries where the redbreast is found, and particularly on the borders of forests. It is very rare in this country : in Yarrell's *British Birds* mention is made of four cases in which blue-breasts have been shot in England. The song of the blue-breast is very agreeable : it resembles two voices,—one deep like the humming of a violin string, and the other soft, like the sound of a flute. The blue-breast builds its nest in bushes and in the holes of trees, and lives upon flies, worms, and the larvæ of insects. It is also said to feed upon elder-berries. It lays six eggs, which are of a greenish-blue colour.

BLUE TITS. (*See* TITS.)

BOA CONSTRICTOR, *bo'-ă con-stric'-tor.*—This enormous reptile is found in the interminable marshes of New Guinea, and other hot portions of the American continent, in India and the Indian islands, and in Africa. The branches of the upper and lower jaw of this creature, as well as the bones of the palate, are armed with recurved and pointed teeth, forming four rows above and two below. The pedicle of the lower jaw is movable, which itself is almost wholly suspended to another bone, analogous to the mastoid, attached to the skull by muscles and ligaments. The branches of the lower jaw are not united, and those of the upper jaw are attached to the inter-maxillary bone only by ligaments, so that these animals can expand the mouth sufficiently to swallow bodies much larger than themselves. The ground-colour of the boa is most frequently a yellowish-gray ; and disposed along the entire length of the back is a series of chain-like reddish-brown variegations, leaving large open oval spaces of the ground-colour at regular intervals. Boas have been reported, by credible authorities, as reaching the enormous length of thirty feet ; and it is no uncommon thing to read of their reaching *sixty* feet in length. Indeed, if we go back to the period when Rome was a great city, we shall read of one that had its lair on the shores of the Bagradas, and that measured a *hundred and twenty* feet in length. All the weapons the army of Regulus was able to bring against the monster were of no avail, and it was not slain till it had destroyed several battalions, and the siege-engines, loaded with ponderous stones, were levelled against it. It is certain, however, that this boa, if not a pure invention, has been lengthened outrageously. Actually, the boa constrictor possesses enormous strength, appetite, swallow, and powers of digestion. They have been known to swallow whole goats and pigs, beginning the prey at the muzzle and gradually sucking it down. In December 1861, a boa constrictor, confined in the Jardin des Plantes, swallowed the blanket provided for its warmth, and, after retaining the indigestible meal for four weeks, disgorged it : it died shortly afterwards. There are several other of the boa species, besides the above : the spotted boa (*Boa scytale*) of South America, the ringed boa (*Boa cenchria*) of the same country, the embroidered boa (*Boa Phrygia*) of the East Indies, the canine boa, (*Boa canina*,) and the garden boa, (*Boa hortulana*.) The embroidered boa is supposed to be the most splendid of the tribe; it is about four feet long, the ground-colour is white, the back tinged with golden-brown, while along the whole of the upper part is a series of black variegations bearing a striking resemblance to embroidery.

Boar, *bore*, the male of swine. (*See* Hog.)

Boar, Wild, (*Sus scrofa.*)—All the varieties of the useful genus *Sus* that are now seen in civilised countries owe their origin to the wild boar, which is a native of nearly all the temperate parts of Europe and Asia. It was formerly a beast of chase in the woods of this country, and, at the present day, it is hunted in India and in many parts of Europe. It is generally more gaunt and bony than the common hog, and its muscular strength is greater. When about a year or two old, the hide has a yellowish-brown hue; but, in time, this changes to a dark brindled gray. There is a fine soft hair, of a woolly nature, next the skin, between the bristles. The snout of the wild boar is rather longer than that of the common hog; but the chief difference lies in the savage disposition of the former and the extraordinary length of his tusks. The females are mild, except when their young are attacked. The tusks of the wild boar are long, curved, and sharp, and are capable of inflicting severe and fatal wounds. After they are five years old, however, these tusks begin to turn up, and are not such formidable weapons. Buffon says of wild boars:—"These animals, when they have young, form a kind of flock, and it is upon this alone that their safety depends; when attacked, the largest and strongest front the enemy, and by pressing all round against the weaker, force them into the centre." On account of the excitement and danger connected with wild-boar hunting, it has been at all times a very favourite sport. The ancient Romans used to hunt them on foot with large spears. In later times, William the Conqueror punished, with the loss of their eyes, all persons convicted of killing the wild boar, the stag, or the roebuck. (*See* Hog, Sus.)

Boar-Fish, (*Capros*,) a fish of the Dory family, which takes its name from the resemblance borne by its mouth to the snout of the hog. Its fins are covered with rough scales, and it has no spines along the dorsal or anal fins. The eyes are very large, and placed far forward. It is of a carmine colour, lighter below, and with seven transverse orange bands on the back. It is a well-known inhabitant of the Mediterranean, and is very rarely seen on the British coast. Its flesh is of poor quality.

Boatbill, *bote'-bill*, (*Cancroma cancrophaga*,) an inhabitant of Cayenne, Guiana, and Brazil. It is about the size of the domestic hen. Its beak resembles a boat reversed, having a strong keel-like ridge down the middle of the upper mandible. The food and general habits of this bird place it among the herons. It chiefly lives by the sides of rivers.

Boatman, Water, a popular name for insects belonging to the order Heteroptera, and family Notonectidæ.

Bobac, *bow'-back*, a small rodent animal belonging to the marmots, and sometimes called the Poland marmot. It is found in parts of Asia and Northern Europe. The fur of the bobac is remarkably thick, soft, and long, and its colour is gray with a very slight tinge of yellow. It is gregarious, and assembles in little troops on the sides of valleys. The scientific name is *Drotomys bobac.*

Bob-o-link, a popular name for the Rice Troopial of America, *Dolichonyx oryzivorus.* This little bird is very plentiful, and passes in vast flocks from north to south. When full fed, it is very fat, and is said to equal the ortolan in the delicacy of its flesh. Its colour is black and yellow. It is allied to the starlings and orioles.

Bohemian Waxwing, *wăx'-wing*, (*Ampelis garrula*,) a bird which is a winter visitant to Britain. The country in which the young are reared is not known with certainty. M. Temminck, however, states that the European waxwing breeds in the eastern part of the north of Europe, and lives in the northern parts of Asia. The waxwing is about the size of the starling, and is distinguished more for its pretty plumage and graceful form than for superior vocalisation. It is called the waxwing because the tips of some of the secondary and tertiary feathers are furnished with a verysmooth hairy appendage, which looks as if red sealing wax had been dropped upon the wing.

Boiga, *bow'-ĭ-gah*, a tree snake of Borneo, *Ahætulla liocercus.* It is very active, darting about the branches with wonderful speed, its green scales sparkling as it passes along. It is quite harmless, and is often used as a toy by children.

Bombardier Beetle, a name applied to many coleopterous insects of the tribe Carabidæ. They are divided into two groups,—the *Brachini* and the *Apteri;* the latter have no membranous wings under the wing-sheath. Those found near the tropics are large and brilliantly coloured, but those found in this country are generally small. They are called bombardier beetles on account of a remarkable property they possess of violently expelling from the anus a pungent acrid fluid, which, if the species be large, has the power of producing discoloration of the skin, similar to that produced by nitric acid. It also changes blue vegetable colours to red, and then to yellow. The most common English species is little less than half an inch long: if irritated, it will make more than twelve rapid discharges. Each expulsion of the fluid is accompanied by a very loud report, considering the size of the insect. The bombardier beetle is generally found under stones, and occurs plentifully in chalky districts.

Bombardier Frog.—This frog is found in several parts of Europe, grayish hair above and orange below, spotted with black. When alarmed it gives out a powerful odour of garlic. Its scientific name is *Bombinator igneus.*

Bombus, *bom'-bus*, a genus of large-bodied hymenoptera, properly known as humble bees.

Bombyx. (*See* Silkworm.)

Bonassus, a name for the Aurochs or Lithuanian Bison. (*See* Bison.)

Bone, *bone*, in Anat., is a hard complex structure, forming the framework or skeleton of the body in man and the higher animals. It is confined to vertebrate animals; and even in the lowest order of this class, the cartilaginous fishes, it is entirely wanting. The bones form a framework for the moulding and adequate support of the soft parts of the body; cavities for the lodgment and protection of delicate organs; joints for locomotion, and levers for the action of the muscles. They are always in the interior of the body, and even when they approach the surface are covered by some soft membrane, muscle, skin, &c. The first development of bone is commonly—though not always, as in the bones of the head—preceded by the formation of a cartilaginous structure, occupying the place which the bone is afterwards to take. It has commonly been said that the bone is formed by the ossification of the cartilage; but this, for various reasons, is thought not to be the case. The process of bone-formation always commences in the immediate neighbourhood of blood-vessels, which pass down into canals excavated in the substance of the cartilage, and lined by a continuation of its investing membrane. Hence the spots where these vascular canals are especially developed are termed centres of ossification. One of these is usually found in the centre of the shaft of a bone, and one at each end, with an additional one for any considerable projection or process. In the flat bones there is generally one in the middle of the surface, and one in each of the principal processes. Until the bone attains its full dimensions, the parts which contain distinct centres are not connected by osseous union, but only by cartilage, so as to allow an increase in the size of the bone by the growth of cartilage between its detached portions, which gives place to bony structure when there is no further need of increase. There exists a close correspondence between the number of ossific centres in the early condition of the skeleton of all vertebrated animals. The growth of bone is effected by the addition of new tissue in three different modes:—1. By the development of new bone in the cartilage between the parts yet remaining separated; 2. By the development of new bone in the membrane covering the surface; and 3. By the interstitial formation of new layers within the canals of the osseous fabric already developed. The perfect reparation of bone after severe injuries, effected by the development of new osseous tissue in the substance of membrane or cartilage formed in the seat of injury, is one of the most remarkable features of its character. Bones are so constituted that a constant process of deposition and absorption is carried on in them, as in the softer tissues, modelling the shaft into its requisite proportions during the successive stages of growth. It is much more actively carried on in youth than in middle life, and is greater in the vigour of manhood than in old age. Bones increase in length not so much by interstitial deposit, as by addition to their ends; that is, by progressive ossification of the layers of cartilage which intervene between the ends of the shaft and the epiphyses. Bones are largely supplied with blood-vessels. The solid osseous texture, which forms the cylindrical shafts of the long bones and the thick external plates of the denser flat bones, is penetrated by a series of large canals, termed Haversian, (after their discoverer,) which form a network in its interior, and serve for the transmission of blood-vessels into the interior. These canals, in the long bones, run for the most part in a direction parallel to the central cavity, and communicate with this, with the external surface, and with each other, by frequent transverse branches. They vary

in diameter from 1-200th to 1-2000th of an inch, averaging about 1-500th; and are smallest near the outer surface, where the bone is most compact; but become gradually larger towards the interior. In the long bones of man and of most mammalia there is a central cavity, which is filled with the fatty substance known as marrow; and the space in which the marrow lies is called the medullary canal. This cavity does not exist in the bone in its early state, but is formed by the removal of the cancellated osseous tissue first developed in its interior. Among birds, however, the central cavity, instead of being occupied by marrow, is filled with air, and communicates with the lungs; so that the membrane lining it becomes an auxiliary organ of respiration; whilst the lightening of the bones thus produced diminishes their specific gravity. Bones are covered externally by a strong fibrous membrane termed the periosteum, which serves to protect the blood-vessels entering them. The medullary canal is also lined by an extremely delicate membrane, termed the medullary membrane, which supports the marrow, and provides a stratum for the subdivisions of the medullary artery before they penetrate the contiguous osseous substance. The Haversian canals are also lined by a similar membrane. Though bones possess little sensibility in health, yet, when diseased, they become highly sensitive, a manifest indication that they are supplied with nerves. These may, indeed, be traced into some of the minute foramina on the shaft of a long bone, but more easily into the articular ends. A nerve also enters the medullary canal with the nutrient artery of the medulla, and divides, like the artery, into an ascending and a descending branch. Bone is composed of a basis of animal matter, impregnated with "bone-earth," or phosphate of lime. The first ingredient makes it tenacious and elastic; the second gives it the requisite hardness. These may be separated from each other: the latter may be entirely dissolved away, by soaking the bone in dilute muriatic or nitric acid, when a substance of cartilaginous appearance is left; the former, by subjecting the bone to a heat sufficient to decompose the animal matter, when we obtain the whole calcareous substance *in situ*. The animal portion of a bone forms about one-third, the earthy about two-thirds; and the relative proportion of the two elements is said to differ little in different classes of animals. It is not yet a settled point whether the proportions vary at different periods of life; but the general opinion is that they do, the animal element predominating in early life, the earthy in old age. The bony framework of the higher classes of vertebrate animals presents very nearly the same chemical characteristics in most individuals. Bones, when dried at 212° until they cease to lose weight, consist of one-third ossein, or organic matter, and two-thirds of phosphate and carbonate of lime and phosphate of magnesia. Ossein, when boiled in water, gradually dissolves, leaving a small quantity of fatty and vascular matter floating on the solution, which, on cooling, gelatinises, forming a weak glue or size, consisting of nearly pure gelatine. The earthy matter may be separated from the ossein, either by means of an acid, or else by boiling in water in a Papin's digester, at a temperature over 300°, the gelatine being only dissolved at that heat. The mineral constituents of bone are used as manure and in the manufacture of cupels. When bones are distilled in close vessels, at a gradually increasing temperature, oily matters, mixed with carbonate of ammonia, pass over, leaving behind bone-black, or animal charcoal. The following are the analyses of ox-bone by Berzelius, and of the human forearm by Hemtz:—

	Ox-bone.	Human fore-arm.
Animal matter..........	33·30	31·11
Phosphate of lime.....	55·45	59·14
Carbonate of lime.....	3·85	6 32
Phosphate of magnesia	2·05	1·20
Fluoride of calcium...	2 90	2·23
Potash and soda salts.	2·45	
	100·00	100·00

The great value of ground bones as manure depends upon the quantity of phosphate of lime contained in them: hence battle-fields are notably fertile. Ground bones are now generally prepared for manure by adding a certain portion of sulphuric acid to them by which means a superphosphate of lime is formed, which is soluble and easily absorbed by the plants to which it is applied. (*See* Anatomy.)—*Ref.* Carpenter's *Principles of Physiology;* Holden's *Human Osteology;* Quain's *Anatomy*

Bonito, *bon'-e-to*, (Sp.,) a name applied to several fishes belonging to the family Scomberidæ. There are three varieties,—the *Thynnus pelamys*, the *Pelamys sarda*, or Belted Bonito, and the *Auxis vulgaris*, or Plain Bonito. The *T. pelamys* resembles the tunny, and is not unlike a large mackerel. In tropical climates it is found in large numbers, and is well known to sailors as one of the fishes constantly seen in pursuit of the flying-fish. It is a very pretty fish, of a rich blue colour, with four dark lines stretching from the pectorals to the tail, on either side of the belly. Its average length is about two feet, and it is generally caught with an imitation flying-fish as a bait. The belted bonito is common in the Mediterranean and Black Sea. The plain bonito is also found in the Mediterranean, where its flesh is salted or pickled, and used for food; but it is never eaten when fresh.

Bonnet Monkey, a macaque of India and Ceylon, remarkable for the black patch of hair upon its head. It is very common, and great numbers are brought to this country. Its scientific name is *Macacus sinicus*.

Bonte-Bok, *bon'-ty-bok*, a beautiful small South African antelope, *Damalis pygarga*, sometimes called the Pied antelope, and White-faced antelope. It is gregarious, and lives in little herds of eight and ten in number. Its colour is deep purplish red, becoming nearly black on the outside of the limbs, relieved by a large white patch on the haunches, and white legs.

Bony Pike, *pike*, (*Lepidosteus osseus*,) an elongated pike-like fish, inhabiting the warmer lakes of America. The jaws of this fish are usually produced into a long narrow snout, presenting considerable resemblance to that of the Gangetic crocodile. The vertebral column presents a structure such as is met with in no other fishes, the bodies of the vertebræ being regularly articulated together.

Booby, *boo'-be*, (*Sula fusca*,) a name given to a large bird, a species of gannet. It is not quite so large as a solan goose, and it inhabits the desolate islands and unfrequented coasts of most warm climates. It has received its name in consequence of its apparent stupidity, in sitting quietly and allowing itself to be knocked on the head, or be taken away by any one attempting it. It is very powerful on the wing, and feeds on fishes, which it watches while flying close to the surface of the water, and then catches by suddenly diving down upon them. Its colour is dark brown, rather white underneath. Its bill is much longer than its head, and its gullet is so expansible that it is able to swallow fishes of large size. The male and female resemble each other closely in appearance, and the latter lays only one egg. The flesh of the booby, like that of all birds that live on fish, is not agreeable when cooked. (*See* Gannet.)

Bookworm, a popular name of a small beetle, (*Ptilinus*,) which bores holes completely through books that have been left undisturbed. It also bores through wood and does great damage to furniture. Wool, leather, and other substances, are also devoured by these beetles.

Boomslange, *boom'-slang-e*, a tree snake of Southern Africa, (*Bucephalus Capensis*.) It is quite harmless, though generally dreaded as a poisonous serpent. It feeds mostly on birds.

Borer, *bor'-er*, a name given to many very small coleopterous insects of the genus Ptinus. Their name is derived from the fact that their larvæ, small white maggots, eat their way into old wood, &c., by means of strong cutting jaws, called *maxillæ*. These holes, which they are constantly making in old furniture, have all the appearance of having been produced by a fine gimlet or drill. After working its way into the wood, the borer fills up the drill-hole in its passage with a fine powder, and forms a cocoon, from which it afterwards emerges in the form of a small winged beetle. The *Anobium tesselatum*, one of the same genus, is remarkable for a loud ticking noise which it makes at night, and which has gained for it the title of the Death-watch. The *Anobium striatum* is also remarkable for the persistent way in which it simulates death.

Boro-Pooloo, native name for a valuable silk-producing insect, *Bombyx textor*, a native of India, and much cultivated in Bombay.

Borele, native name for the rhinaster or small black rhinoceros of Southern Africa. (*See* Rhinoceros.)

Bos, a genus of hollow-horned mammalia belonging to the family Bovidæ. In this genus the horns are neither ridged nor knobbed, and their shape is a curve upwards and outwards. (*See* Bovidæ.)

Bosch-Vark, *bosh-fark*, Dutch name for the bush hog of Southern Africa, *Cheiropotamus africanus*.

Botaurus, *bŏt-aw'-rus*, a genus of herons. (*See* Bittern.)

Bot-Fly, *bot'-fli*, (*Œstridæ*.) — Although most of these insects are incapable of taking nourishment when in their perfect state, from the obsolete nature of their mouths, they are nevertheless to be regarded as among the greatest pests that afflict cattle. During their larva state they are all parasitic upon the various herbivorous animals, some of them harbouring in the skin, and others in the internal cavities of their bodies. In horses these pests are called *bots;* in sheep, *maggots;* and in oxen, *wurbles.* Of the internal parasites, some live in the frontal sinuses of sheep and deer, the parent laying her eggs in the nostrils of the animal, whence the larva creeps up to its destined abode; whilst others (the bots) make their way to the very core of the animal's intestines. The eggs of these latter are laid upon the skin of the horse in such positions as are easily reached with his tongue. This selection of situation, however, is not invariable, nor, according to Newman, need it be, to ensure the bot's purpose. He says, "All naturalists must have observed how commonly the eggs of the bot are deposited on that part of a horse's shoulders which he can never reach with his mouth; and thus, to a casual observer, it would seem that they must perish, and fail in the object for which their parent designed them. Now there is a provision of nature which exactly counteracts this difficulty. When horses are together in a pasture, and one of them feels an irritation on any part of the neck or shoulder which he cannot reach with his mouth, he will nibble another horse on the corresponding part of his neck or shoulder, and the horse so nibbled will immediately perform the kind office required of him, and begin nibbling away at the part indicated." After the eggs have remained among the hair of the horse's hide four or five days, they arrive so near maturity that the least additional heat is sufficient to hatch them. This additional heat is supplied by the application of the friendly horse's lips and tongue; the larvæ are liberated, and, adhering readily to the moist surface of the horse's mouth, are conveyed straight to his intestines. It is satisfactory to learn that opinion is at least divided as to whether the bot-fly in the horse's stomach is hurtful. The horse has an instinctive horror of this insect, and, as soon as it flies near him, he gallops round the field or enclosure until he is in a profuse perspiration, and then comes to a sudden stop, in a state of tremor. The fly makes a most delicate poise on the wing, and then suddenly darts at the horse and deposits an egg. This is repeated until several hundreds are affixed to the hairs, generally of the leg. When the larvæ become perfect, they pass from the body of the animal with the dung, in which they remain until they are matured into a fly. They frequently attach themselves, by a hook-like process, near the anus of horned cattle, and drop with the dung. In the summer months oxen frequently stand in a pond or pool for a considerable time, their instinct leading them to this course in order that they may effectually get rid of their future enemy.

BOTHRIOCEPHALUS, *bŏth-ry-o-kef'-al-us,* a genus of entozoa, popularly called Tape-worms. The head of this genus is always large in proportion to the body.

BOTRYLLIDÆ, *bow-tril'-lid-ee,* a group of tunicate molluscs, popularly called Sea-grapes, because they are clustered together like grapes on the stalk; and Sea-squirts, because when handled, they discharge water from the siphon to some distance. If a bunch of the common sea-squirt, *Ascidia mentula,* be taken in the hand, the person holding it will often be drenched with water

BOTTLE-FISH, (*Saccopharynx ampullaceus,*) a very singular fish, belonging to the genus Saccopharynx. Only two specimens of the genus have been taken, and, with the exception of size, they realise many of the fabulous accounts of the sea-serpent. One was caught in the entrance to Davis' Straits, and measured four feet and a half, and the other between Iceland and Labrador,—it was six feet long. The most singular fact connected with the bottle-fish is, that its body is capable of being inflated like a leathern bottle, and it has a long slender tail like a whiplash. It has a pointed snout, and its mouth is furnished with long sharp teeth. Under the small pectorals the three branchials can be seen through the irregularly-shaped gill openings; and the extensibility of the jaws is greater than that of the serpent tribe. It has a slightly granular, but soft, loose, and slimy skin, and is very voracious; one of the examples referred to was discovered to have swallowed a fish longer than its own body, and the other a sea-perch thicker than itself.

BOUQUETIN, *book-e-tin',* a name for the ibex, *q. v.*

BOVIDÆ, *bo'-vi-de,* (Lat. *bos, bovis,* an ox,) the hollow-horned ruminating animals belonging to the class Mammalia, order Ruminantia. The species belonging to this family are hoofed, their stomachs being adapted for chewing the cud. Their frontal bones are usually provided with hollow horns. In this family are included,—*Bovina,* the oxen; *Antelopina,* the antelope; *Oveæ,* the sheep; *Giraffina,* the giraffes; *Cervina,* the deer; *Moschina,* the musk-deer; and *Camelina,* the camels.

BOWER BIRDS.—These remarkable birds, of which several species are known, are natives of Australia. They derive their name from their habit of constructing a bower of twigs, in which they play about. This bower is made by interweaving the twigs into a strong platform, and then weaving into them a double row of upright twigs meeting above, so as to form a continuous arch of several feet in length. Through this arch the birds are fond of running, and they decorate it by gathering any light-coloured object and laying it over the entrance. Shells, bits of rag, broken pottery, feathers, and other articles are used for this purpose, and so keen-eyed are the birds, that whenever a small article, such as a seal, a ring, or a pipe is lost, the loser always searches the bowers of the birds for it. The bower birds are allied to the starlings. The two species are the SATIN BOWER BIRD, (*Ptilonorhynchus holosericeus,*) and the SPOTTED BOWER BIRD, (*Chlamydera maculata.*)

BRACHINUS. (*See* BOMBARDIER BEETLE.)

BRACHIOPODA, *brăk-i-op'-o-da,* (Gr. *brachion,* an arm, *pous,* a foot,) a term applied to certain molluscous animals having bivalve shells. They derive their name from the remarkable organs by which they procure their food. From the sides of the mouth project two long arms, disposed wholly or partly in spiral curves when not used for seizing the prey. These organs are not only used for obtaining food, but also in maintaining the necessary current for respiration. They are usually furnished with a number of vibratory filaments. The *Brachiopoda,* or *Pallio-branchiata,* differ from the great majority of recent molluscs with bivalve shells, both internally and externally. The species now existing are very widely diffused, and are all marine; one of them, the *Crania personata*, has been brought up from a depth of more than 400 yards.

Brachium, *brai'-ki-um*, (Gr. *brachion*, the arm,) in Anat., is the name given to the arm, or that part of the upper extremity which extends from the shoulder to the wrist. The term *brachial* hence forms part of the name of certain portions of the arm, as the brachial muscle, the brachial artery. The *brachial muscle*, or *brachialis internus*, is situated on the fore part of the os humeri. It rises fleshy from the middle of the os humeri at each side of the insertion of the deltoid muscle, covering the inferior and fore part of this bone, and is inserted by a strong short tendon into the coronoid process of the ulna. Its use is to bend the fore-arm. The *brachial artery* is a continuation of the axillary artery, which takes this name as it passes behind the tendon of the pectoralis major. It runs down the inner side of the arm, along the inner edge of the biceps muscle, behind the vena basilica, giving off several small branches in its course. Below the bend of the arm it divides into two branches,—the cubitalis and radialis.

Brachyteles, *brak'-it-e-lees*, a genus of pecharite tailed monkeys, (*Cebidæ*,) from South America, in which the thumb of the fore paws is exceedingly small, and the fur is woolly. The mono, or miriki, belongs to this genus.

Brachyurus, *brak-i-yew'-rus*, a genus of South American monkeys of the family Cebidæ. The tail is very bushy and shorter than the body. The cuxio, or bearded saki, belongs to this genus.

Bradypus, a genus of sloth, in which the hind feet have three toes joined as far as the claws. (*See* Sloth.)

Brahmin Bull, (*Bos indicus*,) a species of Asiatic ox, chiefly distinguished by a fleshy hump rising from the withers. Its ears are pendulous, and its dewlap largely developed. It varies very much in size. In many parts of India it is used as a beast of burden, and is said, when harnessed to a carriage, to travel with ease thirty miles a day. The Hindoos regard them with veneration; and, though they put them to heavy labour, consider it sinful to slaughter them.

Brain, *brain*, is the name given to a soft pulpy substance, which in man and the higher orders of animals constitutes one of the great central masses of the nervous system, (*which see*.) As is to be expected, it is found most perfectly developed in man, in whom, with its membranes, vessels, and nerves, it constitutes the whole of the matter enclosed within the bones of the skull, and is, hence, termed the *encephalon*. In males, the average weight of the full-grown human brain is about 49 or 50 oz.; in females, 44. It varies, however, considerably in different individuals. In a series of 278 cases, the maximum weight of the adult male brain was found to be 65 oz., and the minimum 34; in 191 cases, the maximum weight of the adult female brain was 56, and the minimum 31 oz. The brain of the naturalist Cuvier is said to have weighed upwards of 64 oz., and of that of the late Dr Abercrombie, 63 oz. avoirdupois. Anatomists differ as to the size or weight of the brain at different periods of life. Soemmerring believed that the brain reached its full size as early as the third year; the Wenzels and Sir William Hamilton fixed the period about the seventh: and Tiedemann, between the seventh and eighth year. Gall and Spurzheim were of opinion that the brain continued to grow until the fortieth year. From a series of observations, however, "it appears that in general the weight of the brain increases rapidly up to the seventh year, then more slowly to between sixteen and twenty, and then more slowly to between thirty-one and forty, at which time it reaches its maximum point. Beyond that period there appears a slow, but progressive, diminution in weight of about 1 oz. during each subsequent decennial period."—(Quain's *Anatomy*.) The only animals that possess absolutely a larger brain than man are the elephant and whale. In the former, it is said to weigh between 8 and 10 lbs., and in the latter it was found, in a specimen 75 feet long, to weigh upwards of 5 lbs. Generally speaking, as compared to the weight of his body, the brain of man is heavier than that of the lower animals; but there are some slight exceptions to this rule, as in the case of certain species of small birds and in the smaller apes. The proportionate weight of the human brain to the body is greatest at birth, being about 1 to 5·85 in the male, and 1 to 6·5 in the female. At the tenth year, it is about 1 to 14; at the twentieth, about 1 to 30; and after that age it averages about 1 to 36·5, with a trifling decrease in advanced life. In general, the size of the brain bears a certain relation to the mental powers of the individual, and a certain amount of it is always necessary to sound mental action. The brain is divided by anatomists into the cerebrum, or brain proper; the cerebellum, or little brain; the pons Varolii, and the medulla oblongata. The *cerebrum* occupies the whole of the superior portion of the cavity of the cranium, or skull, and is by much the largest portion of the brain, averaging, in the male, nearly 44, and in the female, about 38¾ oz. The *cerebellum* occupies the lower and back part of the cranium, and is next in size to the cerebrum, weighing, in the male, about 5¼, and in the female, about 4¾ oz. The *pons Varolii* and *medulla oblongata* occupy the base of the brain, and together average about 1 oz. in weight, being rather larger in the female than in the male. The former occupies a central position on the under surface of the brain, and is connected with the cerebrum by two cords or peduncles, termed *crura cerebri*, with the cerebellum with two similar cords, termed *crura cerebelli*, and is also in contact with the medulla oblongata. This last is that portion of the encephalon which connects it with the spinal cord. It is of a pyramidal form, having its broad extremity turned upwards, and connected with the pons Varolii, while its under portion is united with the spinal cord. The brain is covered by three membranes, two of which, the outer and inner, are termed *matres*, from the old notion that they gave rise to the other membranes of the body. The outermost of these membranes, from being of a firmer texture than the others, is termed the *dura mater*, and encloses the brain with its appendages, lining also the whole internal surface of the cranium. Its outer surface, which adheres to the bones of the cranium, as the periosteum does to the other bones, appears to be rather rough and irregular; but the inner surface is smooth and shining, and is lubricated by a fluid which is secreted by it. This membrane is the densest and strongest of the whole body, its component fibres interlacing each other in all directions. It sends off several folds or processes, which descend between certain portions of the brain. The principal of these is the superior longitudinal process, or *falx cerebri*, as it is termed, from its supposed resemblance to a sickle or scythe, which extends from the fore to the back part of the skull, and descending into the substance of the brain, divides it into two portions, called the right and left hemispheres. Where it terminates behind, there is a large lateral expansion of the same membrane, extending across the back part of the skull, and separating the cerebrum from the cerebellum : it is called the *tentorium cerebelli*. From the middle of the tentorium another membranous expansion takes its rise, and descending downwards between the lobes of the cerebellum, terminates at the edge of the foramen magnum, or great occipital hole. It is termed the *falx cerebelli*. The second, or middle, of the three membranes, is an extremely thin and delicate substance, and from its fancied resemblance to a spider's web, it receives the name of *arachnoid*. It is transparent and colourless, and is spread uniformly over the surface of the brain. The third investing membrane, the *pia mater*, is also very delicate and tender, but differs from the arachnoid in its abounding in blood-vessels, whereas no blood-vessels have yet been discovered in the latter. The blood-vessels with which every part of this delicate membrane is covered are the nutrient arteries of the brain. They subdivide and ramify to an extreme degree upon the surface of this membrane, so that the blood may enter the substance of the brain only in very minute quantities. As the pia mater contains and supports the nutrient vessels of the brain, it is not only, like the others, spread over its entire surface, but it also penetrates between all its convolutions, and lines every cavity which it contains. The nervous matter of the brain is composed of two distinct substances, differing from each other both in colour and consistence. One of these is the *gray* or *cineritious substance*, termed also, where it forms the outer covering, as in the cerebrum and cerebellum, the *cortical* substance, from its surrounding the inner part like the bark of a tree. The cineritious substance is of a softer consistence than the other, and is composed almost entirely of blood-vessels, connected and sustained by exceedingly fine cellular membrane. It forms an outer covering to the entire surface of the cerebrum of generally about one-tenth of an inch in thickness. The *white* or *medullary substance*, which constitutes the internal portion of the cerebrum and cerebellum, is of firmer consistence, and is composed of microscopic fibres arranged into laminæ and bundles, between which intervening vessels ramify. In the cerebrum these fibres run, in general, in such a direction as to converge towards the base of the brain. The *cerebrum* is of an ovoid shape, but irregularly flattened on its under side. It is divided into two lateral halves, termed *hemispheres*, separated from each other through a great portion of their extent by the great longitudinal fissure, into which is inserted the falx cerebri. This fissure, both before and behind, passes quite through to the base of the cerebrum ; but in the middle it is interrupted by a transverse portion of white substance termed the *corpus callosum*, which connects together the two hemispheres. Each hemisphere is subdivided into an anterior, middle, and posterior lobe, but it is only on the under surface of the brain that these lobes are properly marked off. The anterior and middle lobes are separated from each other by a deep fissure, named the *fissura sylvia*, which extends obliquely backwards to a considerable depth. The middle and posterior lobes are not so distinctly marked off; but anatomists regard as the posterior lobe that portion of the cerebrum which lies over the cerebellum. The surface of the cerebral hemispheres is not plain and uniform, but presents numerous tortuous eminences, named convolutions or *gyri*, which are separated from each other by deep grooves or furrows, termed *sulci*. These are generally about an inch in depth, but they vary considerably in different brains, and even in different parts of the same brain ; and, indeed, those of one side frequently differ from those of the other. The convolutions are more marked as the brain is better developed, and are more numerous and manifest in man than in the lower animals. As the cortical substance of the brain is continuous over the whole surface of the hemispheres, in the fissures as well as upon the convolutions, it follows that the greater the number and depth of these, the greater is the superficial extent of the gray matter which is generally regarded as the seat of all the nervous manifestations, as sensation, volition, &c. On slicing away the substance of the hemispheres to a level with the *corpus callosum*, it will be seen to be formed by the converging fibres of the two hemispheres, whence it has been termed the *commissura magna*, or the great commissure of the brain. Under the corpus callosum are the two great cavities termed the *lateral ventricles*, distinguished into right and left. They are very irregular in shape, and are described as each consisting of a body and three horns, or *cornua*,—the anterior, posterior, and middle. They are separated from each other by the septum lucidum, which descends from the lower surface of the corpus callosum, and consists of two laminæ, between which is the very small cavity of the septum lucidum. It rests upon the *fornix*, a triangular medullary body, having its apex directed forwards and its base backwards. Posteriorly it is connected with the corpus callosum, and it divides laterally into a posterior cornu on each side, which terminates in, or rather is continuous with, the *tænia hippocampi*, and the *hippocampus major* and *minor*. The sides of the fornix slightly overlap the optic thalami, while its inferior surface covers the third ventricle, from which it is partly separated by the *velum interpositum*. The third ventricle is a small narrow cavity lying between the *optic thalami*. These last are two large firm oblong bodies nearly an inch and a half long by three-fourths of an inch wide and deep. Anteriorly the optic thalami are continuous with the corpora striata, and posteriorly they are connected by small peduncles with the Pineal gland, and with the nates. The *corpora striata* are two gray pear-shaped bodies, but internally they are streaked with white matter,—whence their name. In front they are obtuse, and approach each other; but they separate and narrow as they proceed backwards. The *Pineal gland* is a small portion of gray matter about the size of a small pea. It was supposed by Descartes to be the seat of the soul. The *corpora quadrigemina* are four small white round bodies intimately connected with each other, of which the anterior and superior pair are called the *nares*, the posterior and inferior being named the *testes*. The anterior commissure is a medullary band uniting the corpora striata; the middle commissure is composed of gray matter, and connects together the two optic thalami, as does also posteriorly the posterior commissure, which is a rounded white cord. The *crura cerebri* are two short, thick, rounded cords connecting the optic thalami with the pons Varolii. They are composed principally of medullary matter, but in their interior is a semilunar mass of dark gray matter. The *cerebellum*, or little brain, consists of a body and three pairs of crura or peduncles, by which it is connected with the rest of the encephalon; and it is not covered with convolutions like the cerebrum, but appears to be formed of a number of lamellæ, or plates, with sulci between them. When cut across, the gray and white matter are seen to be arranged somewhat in the form of a tree, the white substance forming the stalks, and the gray the leaves; and hence it has been termed *arbor vitæ*. The two peduncles of the cerebellum connect it with the testes of the cerebrum, and are known as the *processus e cerebello ad testes*; the inferior peduncles—*processus e cerebello ad medullam*—pass downwards to the back part of the medulla oblongata, and correspond with the restiform bodies; the middle two are the crura cerebelli, which pass from the middle of the cerebellum, round the outer side of the crura cerebri, and meet in front in the pons Varolii, constituting its transverse fibres. The space between the cerebellum behind and the medulla oblongata in front is named the *fourth ventricle* of the brain, or the ventricle of the cerebellum. The *pons Varolii*, or annular protuberance, is a comparatively small portion of the brain, and occupies a central position on its under surface, above and in front of the medulla oblongata, with which it is continuous. It consists of transverse and longitudinal white fibres, interspersed with a quantity of diffused gray matter. The transverse fibres, with few exceptions, communicate with the cerebellum by means of the middle crura; while the longitudinal fibres are those which ascend from the medulla oblongata into the crura cerebri. The *medulla oblongata* is that part of the encephalon which is immediately connected with the upper end of the spinal cord, and has an inclination obliquely downwards and backwards towards the foramen magnum. It is pyramidal in form, tapering towards its connexion with the spinal cord. It is marked longitudinally by an anterior and posterior fissure, which are continuous with those of the spinal cord, and by which it is partially divided, like the cord, into two lateral and symmetrical halves. On the upper part, however, a new arrangement takes place; for, on each side of the median line, the lateral fissures disappear, and the surface of each half of the medulla presents four eminences or columns, which, commencing at the anterior fissure, and proceeding backwards each way to the posterior fissure, are met with in the following order,—the anterior pyramids the olivary bodies, the restiform bodies, and the posterior pyramids. From the under-part of the brain issue a number of nerves, known as the cranial, and pass through foramina in the base of the skull. They are usually reckoned as forming nine pairs. (*See* NERVES.) The following is the proportions of the different substances that compose the gray and white matter of the brain:—

	Gray.	White.
Water	85·2	73·0
Albuminous matter	7·5	9·9
Colourless fat	1·0	13·9
Red fat	3·7	0·9
Osmazome and lactates	1·4	1·0
Phosphates	1·2	1·3
	100·0	100·0

On the functions of the brain and its several parts, some notice will be taken in treating of the subject Phrenology (*which see.*) In comparing the brain of man with that of the other mammalia, the most obvious distinction is its much greater size in proportion to the size of the body. In the dog the brain bears an average proportion to the body of about 1 to 120; in the horse, 1 to 450; in the sheep, 1 to 750; and in the ox, 1 to 800. The convolutions, too, which are so marked on the human brain, are few, or altogether wanting, on the brains of animals. In particular, in animals, the medullary matter of the brain predominates in every part, while the cineritious is deficient. The nerves of sense, too, in animals are usually much more largely developed than in man. In man the olfactory nerve is not one-fourth of the size of that of the horse, though the brain is so much larger. In the smaller quadrupeds the comparative size of the brain approaches nearer to that of the human, being in the mouse about a forty-third part of the weight of the animal; but it is composed almost entirely of medullary matter. In birds, the brain is in general a much less complex organ than in mammals, presenting no convolutions on its surface, and having only a very small quantity of cineritious matter. Though its bulk is in general proportionally much smaller than the human brain, yet in some of the smaller birds, as the chaffinch and the redbreast, it approaches that of the latter. In fishes the brain is yet more diminished; in the chub being only 1 to 842, and in the lamprey 1 to 1425. It consists merely of two pairs of ganglia and a single one. The two anterior ganglia or lobes are the olfactory lobes, immediately behind which are two others, generally of larger size, called the optic lobes; while behind these is a single ganglion, or lobe, situated in the median line, and termed the cerebellum.—*Ref.* Quain's *Anatomy;* Carpenter's *Human and Comparative Physiology;* Solly *On the Brain;* Todd *On the Brain and Nerves;* Huschke, *Schaedel, Hirn, und Seele des Menschen, und der Thiere, nach Alter, Geschlecht und Race,* Jena, 1854.

BRAIN STONE, (*Meandrina cerebriformis,*) a kind of coral which is convoluted in a manner that greatly resembles the human brain. It is only found in the hot seas.

BRAIZE, an acanthopterygian fish, (*Pagrus vulgaris,*) very common in the Mediterranean, and very scarce on our coasts. It is called the

Pandora and Becker; and when our fishermen catch it, they call it King of the Sea Bream, because it somewhat resembles that fish, but is much handsomer.

Brambling, *brămb'-ling*, (*Fringilla montium*,) also called Mountain-finch. This bird is rather larger than the chaffinch. The tail is forked, and its prevailing colour black, white, and yellow.

Branchellion, *brănk-el'-li-on*, an annulate animal, belonging to the leeches. It is small, flat, and is remarkable for being parasitic on the torpedo.

Branchiæ. (*See* Gills.)

Branchiopoda, *brăn-ki-op'-o-da*, (Gr. *branchia*, gills, *pous*, a foot,) an order of small crustacea, belonging to the division Entomostraca, which usually abound in still fresh waters. These animals have their mouths furnished with jaws fitted to masticate their food; and their name is derived from the peculiarity which they possess in having the *branchia*, or gills, which are numerous, attached to the feet. They swim freely, but their feet are not generally adapted for locomotion. The antennæ, in some cases, serve as organs of motion. While swimming they keep their feet constantly moving, and thus prevent the water from becoming stagnant.

Bream, *breem*, (Fr. *brème*,) (*Abramis Brama*,) a fish of the Carp family, found in deep and still parts of rivers. In proportion to the length of the body, this fish is extremely deep and thin. In length it is about two feet. Its flesh is not in very high repute.

Bream, Sea, (*Pagellus centrodontus*,) a fish of the family Sparidæ, and order Aconthpterygia. The flesh is not much valued for the table; but the fish is a favourite among anglers, because it bites boldly and gives good sport. The teeth are very strong. When young it is called the Chad; and on some of our coasts it is known by the name of Gilt-head.

Breast, *brest*, (Sax. *breost*,) in Anat., is a term applied to the whole of the anterior part of the thorax. In a more restricted sense it is applied to the two globular fleshy protuberances adhering to the anterior and lateral regions of the thorax of females, and containing the mammary or lacteal glands. On the middle of each breast is a projecting portion termed the *papilla* or nipple, in which the excretory ducts of the glands terminate, and around which is a coloured orb or disc called the *aureola*. The use of the breasts is to secrete milk for the nourishment of newly-born infants. They are composed of common integuments and adipose tissue, in which are lodged numerous ducts radiating from the nipple, and afterwards dividing and subdividing into branches and twigs until they terminate in very minute vessels. The enlargement of the breasts is one of the signs of womanhood. Their fullest development commences in the earlier stages of pregnancy, and they continue to increase in size until about the time of delivery, when they are filled with the lacteal fluid, which passes readily on suction into the mouth of the child.

Breeding, *brede'-ing*, (Sax. *bredan*, *brœdan*, to breed,) is the method of multiplying and improving the quality of domestic animals rapidly. Great attention has been paid to the subject of breeding since the commencement of the present century, one notable result being that within the last thirty years the weight of mutton produced has nearly been doubled in proportion to the number of sheep. If a proper supply of food is furnished, any breed of animals will perpetuate itself: the various breeds of wild animals are instances of this fact. But when assiduous attention is paid to the breeding of domestic animals, varieties are produced which are more useful and profitable than the wild breeds, on account of particular properties which they possess. The first point of importance in breeding is the selection of the animals with which to propagate a useful race. These should always be the finest animals possible; and great improvements in the stock existing on a farm are often produced by the introduction of males of a superior quality. In breeding, the purposes for which an animal is reared must always be taken into account. The breeding of horses has occupied attention much longer than that of oxen and sheep. One class of horses is bred for speed, another for conveying rapidly between different places, another for mere labour, or to assist human strength. By attention to the breeding, great excellence has been arrived at in each of these varieties. Strength and speed, in their extremes, are never present in the same animal; but a combination of the two is most useful. (*See* Horse.) The properties desired in sheep and oxen are very different from those required in horses. The fleeces and hides of the former are used as raw materials for manufacture, and their flesh as food. The breeder of oxen and sheep sometimes has the perpetuation of good qualities in view, and sometimes the production of the largest quantity of beef or mutton possible. Since attention has been paid to the breeding of these animals, they have been sent to market at a much earlier age. Sheep and oxen which have been thus improved are both distinguished by small heads, small bones, short legs, and fine skin. Wild animals have precisely opposite qualities. In breeding any domestic animal a near relationship should always be avoided. The principal points to be observed in breeding are as follows:—The kind of animal from which the breed is desired should have distinguishing points, which ought always to be kept in view. The most perfect forms should be selected, and all defects should be corrected with patience and perseverance. Sudden crosses should always be avoided, and, if possible, two or more families of the same kind should be bred distinct, only occasionally crossing them together. The more improved a breed becomes by this means, the more difficult becomes the selection of the animals by which to continue it, and very often, on account of this difficulty, a highly-improved breed will degenerate. (*See* Oxen, Sheep.)

Breeze-Fly. (*See* Bot-Fly.)

Brent-Goose. (*See* Goose.)

Breves, *breevs*, a group of birds belonging to the ant thrushes. They are divided into two groups, the breves and the pittas; the former inhabiting India and Australia, while the latter are found in America.

Brevipennes, *brev'-i-pen-nes*, (Lat., short-winged,) a term applied to several birds of Cuvier's order of *Grallatores*. Their wings are too short to enable them to fly, but are useful as an assistance in running. Their bodies are massive, and the muscles of the thighs and limbs are enormously thick, and they are generally able to run with great rapidity. The ostrich, emu, and cassowary belong to the Brevipennes; and the gigantic *Dinornis*, and other fossil birds, belonged to the same class. All the Brevipennes shun the presence of man, and generally inhabit desolate and solitary localities. Many of them, such as the emu and cassowary, are becoming very rare. The extinct Dodo belonged to the same order.

Brill, *bril*, (*Pleuronectes rhombus*,) a fish resembling the turbot in shape, but inferior to it both as regards size and quality. The London market is chiefly supplied from the southern coast of England, where the brill is very plentiful.

Brine Shrimp, (*Artemis salina*,) a small crustacea belonging to the Entomostraca. It lives in the strongest brine; and is so plentiful in the salt pans of Lymington, that it tinges the liquid of a pink colour. The workmen think that its presence is beneficial to the crystallisation of salt; and if one of the pans happens to be without the brine shrimp, a few are immediately transferred from another pan. It is a pretty little thing, with a long and slender tail, and is very active.

Brittle Star. (*See* Star-Fishes.)

Bronchi, *bron'-ki*, (Gr. *bronchos*, the windpipe,) in Anat., is the name given to the subdivisions of the trachea, or windpipe, which proceed to the lungs. The trachea divides into the two bronchi opposite the third dorsal vertebra. The right bronchus is larger than the left, and is shorter, reaching the lung on a line with the fourth dorsal vertebra. The left bronchus passes under the arch of the aorta. The structure of the bronchi is similar to that of the trachea, being round and cartilaginous in front, and flat, with muscular and fibrous tissues, behind. On entering the substance of a lung, the bronchi divide and subdivide into numerous branches, till they terminate in very minute air-cells.

Bruang, *brew'-ang*. (*See* Bear.)

Brush Turkey, (*Tallegalla Lathami*.)—This bird, called also the Wattled Talegalla, inhabits New South Wales, from Cape Horn to Moreton Bay. It is about the size of a common turkey three parts grown. The whole of the upper surface is of a blackish-brown, the feathers of the chest edged with silvery gray. The skin of the head and neck is of a deep red, and the neck is ornamented with a bright yellow wattle. The most curious circumstance connected with the brush-turkey is, that it does not, like other birds, hatch its eggs by sitting on them, but collects together an immense heap of decaying vegetable matter as a depository for its eggs, and trusts to the heat evolved during the process of decomposition for the development of its young. This heap is gradually collected by the bird for several weeks previous to the period of laying, and is sometimes so large as to contain two or three cartloads. Says Mr Gould:—"The mode in which the materials composing these mounds are accumulated is singular: the bird never uses its beak, but, grasping a quantity in its foot, throws it backwards to one common centre, thus clearing the surface of the ground completely for a considerable distance round. The heap being accumulated, and time allowed for a sufficient heat to be engendered, the eggs are deposited, not side by side, as is ordinarily the case, but planted at the distance of nine or twelve inches from each other, and buried at nearly an arm's depth, perfectly upright, with the large end upwards. They are covered up as they are laid, and allowed to remain till hatched. I have been credibly informed, both by natives and settlers living near their haunts, that it is not unusual to obtain nearly a bushel of eggs at one time from a single heap; and as they are delicious eating, they are eagerly sought after."

Brute, *brute*, (Lat. *brutus*,) a term applied to those animals which act by instinct only, in order to distinguish them from men, who act by reason. It is synonymous with the word "beast."

Buansuah, *boo-an'-swah*, native name for the wild dog of India, (*Cuon primævus*.) It is partly gregarious, and runs in packs, hunting down its prey in fair chase. It can be tamed, and is very useful in boar-hunting, its short, snappish, repeated bite being more injurious to the boar than the lengthened hold of ordinary dogs.

Bubalus, *bew'-băl-us*, a genus of Bovidæ, in which the horns are depressed and angular at the base, and the forehead convex. The true buffaloes belong to this genus.

Bubble Shells. (*See* Bulla.)

Bubo, *bew'-bo*, a genus of eared owls, in which the facial disc is imperfect above.

Buccinator, *buk-si-nai'-tor*, (Lat. *buccina*, a trumpet,) in Anat., is a muscle of the cheek, so called from being brought much into play by trumpeters.

Buccinum. (*See* Whelk.)

Bucephalus. (*See* Boomslange.)

Buceros. (*See* Hornbill.)

Buck, *buk*, (Sax. *bucca*,) the male of the fallow deer. A buck is called a fawn in his first year; a pricket in his second; a sorel in his third; a sore in his fourth; a buck of the first head in his fifth; and a great buck in his sixth. The female of the buck is termed a doe. The term buck is also applied to the male of the goat, sheep, rabbit, and hare. The male of the red deer is termed a stag, or hart, and never called a buck. Many of the South African antelopes are properly wild bucks, such as the water buck, the blue buck, &c. (*See* Deer, Stag.)

Buckhound, *buk'-hound*, a kind of dog formerly very common in England, but comparatively rare now. It was used exclusively for buck-hunting, and closely resembles the staghound, (*which see*.) Many varieties of hounds, beside the buck-hound, are now used for deer-hunting.

Buffalo, *buf'-fă-lo*, (Ital. and Span., *bufalo*,) (*Bubalus buffelus*.)—This animal differs from the bison in having no hump on the back, and only a small dewlap on the breast. Besides this it carries no shock of hair about its neck and shoulders. They generally live in flocks of about a hundred, and affect marshy regions, both on account of the coarse but luxuriant vegetation there to be found, as well as the opportunity for a "mud" bath, of which the buffalo is remarkably fond. The way he indulges this ugly predilection is singular; throwing himself flat upon his side in the mire, he shuffles round and round, the soil yielding to his immense weight the exudation of any moisture it may contain, till he manufactures for himself a delicious basin of mortar covering him to his very eyes. When he emerges and has basked a while in the sun, he looks like some hideous slack-baked clay image. This manœuvre, however, is not without purpose. Among the rank vegetation, and in the air, swarm millions of stinging flies, and until the buffalo's mud coat peels off through long wear, he is as impregnable to their attacks as the clay image he represents. The buffalo is one among the very few animals who manifest no fear at the approach of the tiger; indeed, sportsmen concur that unless a tiger be full-grown and in possession of all his strength, he will not venture to attack the bull buffalo. Should the tiger, made desperate by hunger, attack a herd of buffaloes, his fate is certain. The whole herd will band against the common foe, and, assailing him with hoofs and horns, rend his striped hide to gory ribands, and trample him maimed and crushed into the mire. (*See* Bubalus.)

Buffalo, Cape, (*Bubalus Caffer.*)—This fierce and powerful animal inhabits Southern Africa, and haunts wet and marshy places. It is given to hiding in the thick underwood, and leaping suddenly upon the traveller as he passes by. Sportsmen stand in wholesome awe of this animal, whose thick heavy horns meet at their base, and defend the brain even from a rifle bullet. The Kaffirs would as soon encounter a lion as a buffalo. The flesh is barely eatable, but the thick hide is used for many purposes, especially in making braces and other straps, where great strength and toughness are required.

Bufo, *bew'-fo*, a genus of leaping batrachians, containing the true toads. In this genus the sacral vertebræ are very wide, the parotid glands large, and the toes webbed.

Bug, *bug*, (probably Welsh *bwg.*)—This tiresome insect is too well known to need a devotion of space to its description. It is commonly asserted, though with what degree of truth it is hard to say, that before the year 1670 the insect in question was unknown in England, and that it was imported from America with the timber that country furnished for the rebuilding of London after its destruction by the great fire. Its blood-sucking propensities, and the disgusting smell it emits when excited, are in these days no wonder amongst us. The female bug deposits her eggs at the beginning of summer: they are small, white, and of an oval shape, each being fixed to a hair-like glutinous stalk, ready to adhere to anything it touches.

Bugong, *bew-gong'*, a butterfly belonging to the Heliconidæ, (*Euplea hamata.*) It is a native of Australia, where it is popularly called a moth. It affords food to thousands of the aborigines, collecting in vast numbers on the granitic Bugong mountains, and there being killed by smoke and fire. When dead, they are thrown on a flat spot previously heated by fire, and when scorched, are winnowed, so as to lose the wings and down. They are then pounded into cake-like masses, some of which are eaten fresh, while others are smoked. So plentiful is the supply of bugong, that the natives become quite fat during the moth season.

Bulbuls, *bool'-bools*, a group of Oriental birds allied to the Orioles. They have very sweet voices, and are sometimes called the Oriental nightingales.

Bulimus, *bew-lie'-mus*, a genus of gasteropodous molluscs, containing more than six hundred species. They much resemble the common snails, but can be distinguished by their greater comparative length, the oval shape of the aperture, and the thickness of the lip. Some of them are very large.

Bull, (Du. *bulle,*) in Zool., the male of the *Bos* or bovine genus of quadrupeds, of which the cow is the female.

Bulla, a genus of molluscous animals with univalve shells, whose general characteristics are,—that the shell is sub-oval, that the aperture is oblong and smooth, and that one end is a little convoluted. The animal breathes by gills, but has no respiratory tube, and consequently the margin of the aperture of the shell is entire. Most of this genus, especially of the larger sizes, are furnished with an organ exactly resembling the gizzard of a fowl, and which they appear to use for the purpose of masticating their food.

Bull-baiting, *bull-bait'-ing*, (Du. *bulle*, bull; Goth. *beitan*, to bait,) is the barbarous sport of baiting bulls with dogs. The animal was usually tied to a stake, with the points of his horns muffled, and then attacked by the dogs, who tore him to death for the amusement of the spectators. It is said to have been introduced as an amusement into England about the year 1209.

Bull-dog, *bull'-dog*, (*Canis molossus,*) a variety of the dog, remarkable for its broad, short muzzle. It is generally looked upon as an essentially English dog; but there is a doubt as to whether it has not existed as a definite race since the time of the Romans, or whether it is not a recently formed variety of mastiff. It is smaller than the mastiff, and has a massive head; the forehead sinks between the eyes, and the nose-line rises again at a considerable angle; the lower jaw projects in a remarkable manner beyond the upper, continually showing the teeth; the lips are thick and pendulous, the neck strong and thick, and the legs short. The projection of the under jaw and the livid redness of its eyes give the bull-dog a fierce and forbidding aspect, often heightened by a designing leer, which seems natural to the animal. The strength and courage of bull-dogs are proverbial. They will attack any animal, utterly regardless of its strength and size. They were formerly much used for bull-baiting; since the abolition of which sport, the breed has decreased in numbers. One of these dogs will seize an ox by the nose, and, with apparent ease, hold him still, or throw him on his side, as he is ordered by his master. When trained for the purpose, they fight very savagely with one another; and in certain of the mining and manufacturing districts of England, this sport is still carried on. On growing old, the fighting bull-dog becomes very vicious and dangerous, often inflicting severe bites on the slightest provocation. The bull-terrier is a cross between the bull-dog and the terrier. It is, if possible, more ferocious than the bull-dog itself.

Bullfinch, *bull'-finsh*, (Ang.-Sax.,) (*Loxia pyrrhula,*) a song-bird common to all parts of England and Europe generally. It is about the size of the common hedge-sparrow, but of bulkier build, and rather more than a third of its length is monopolised by its tail. The bill is short, strong, and of a blue-black colour. On the upper part of the head, round the base of the beak, and forming a chin-shaped patch beneath, jet black predominates; the back is ash-gray; breast and belly dusky red; wings and tail black; upper tail-coverts white; legs dark brown. The female exactly resembles the male, except that her colours are less distinctly marked, and her under parts are rather russet than red. The bullfinch has acquired considerable celebrity from the facility with which it learns to whistle airs. Training bullfinches to "pipe" is a mode of making money frequently practised in Germany; considerable pains are requisite. There was one German bullfinch-teacher, named Lewis de Aerg, whose birds were sold for their weight in gold. "I feed the smaller birds with rape-seed," wrote he; "I give them likewise, at times, a little bruised rice soaked into canary wine, and afterwards dried carefully for use. Though giving the bird a few grains while wet with this excellent liquor does mighty well, yet it does not do to be constantly practised."—*Ref.* Beeton's *Home Pets.*

Bull-frog, (*Rana pipiens,*) the largest of the species Rana, or Frogs. It is generally six to eight inches long, exclusive of the feet, and four inches broad. It is an inhabitant of North America, particularly of the Southern States. At a distance its voice resembles the lowing of a bull; hence its name. The fore feet of the bull-frog are unwebbed, and have only four toes; but the hind feet, which are long, are webbed very widely. Its colour is a dull olive, marked irregularly with dark stains; the belly, however, is of a pale green colour, thickly spotted. The bull-frog frequents springs only where the constant running of water has made a deep pool. Scarcely a spring of this description is without a pair of these frogs. When surprised, with a spring or two they leap into their retreat. They prey on other frogs, young ducks and geese, which they swallow whole; it is also believed that they keep the springs in which they reside wholesome. There is an African species of frog which is popularly called the bull-frog, (*Tomopterna adspersa.*) It is edible, and the flesh is said to resemble that of chicken. The native name is Matlametlo. (*See* Dr Livingston's Travels.)

Bullhead, or **Miller's-Thumb**, *bull'-hed,* (*Cottus gobio,*) a small fish, common in our brooks and rivers. It is about four inches long, with a large roundish head, and a capacious mouth, formidably filled with teeth. It is generally found under loose stones at the bed of the stream, and is seemingly so insensible to danger, that, should half a dozen of them be lying together, the juvenile angler may capture the whole by continuing to drop in his bait till they are all hooked. The term bullhead is considered to refer to the large size of the head, and the name of miller's-thumb is doubtless applied because of the resemblance of the same part to the thumb of a miller, which, like this fish's head, is smooth, and broad, and rounded, a form produced by a peculiar and constant action of the muscles in the exercise of his occupation. The miller's hand is constantly placed under the meal spout, to ascertain the quality of the grinding. The thumb, by a particular movement, spreads the sample over the fingers, and serves as a gauge of the value of the produce.—*Ref.* Yarrell's *British Fishes.*

Bull-trout, *bull'-trout,* (*Salmo Eriox,* or *Salmo griseus.*)—This fish, which is often called the gray trout in England, and the sewen in Wales, is nearly allied to the salmon. It generally lives in the sea, but deposits its spawn in rivers. Its form is not so elegant as that of the salmon; its head and neck are thicker, and its tail more bulky in proportion. The colour of the male is reddish brown, and that of the female dark gray; their scales are smaller than those of a salmon of equal size. Anglers look upon the bull-trout as ranking next to the salmon as regards sport. It is usually under 15 lbs. weight, but some attain a weight of 20 lbs. The flesh, which is lighter coloured than that of the salmon, is coarser, and has not so delicate a flavour.

Bungarus, *bun'-gă-rus,* a genus of Indian snakes belonging to the family Elapidæ. It is furnished with grooved poison fangs, and belongs to the same family as the cobra.

Bunodes, *bew-no'-dees,* a genus of sea anemones, known by the vertical rows of warts upon the column.

Bunting, (*Emberiza,*) an interesting group of passerine birds, whose chief characteristic is a bill very strong, short, conical, and compressed laterally, but without any tooth or notch; the upper mandible is narrow, turned in at the edges, and with a bony knot at the palatal end, forming, as a whole, an instrument admirably adapted for breaking the rinds or shells of seeds, and ejecting them without losing any of the kernel. The Common, the Yellow, the Cirl, the Ortolan, the Snow, the Reed, and the Lapland, are the various distinguishing names of the British members of this family. Besides these there are the painted bunting of South America, and the yellow-shouldered bunting of the Cape. When the female of this last-mentioned species loses, through age, the faculty of propagating her kind, she throws off her comparatively modest attire, and appears, for the rest of her life, as splendidly plumed as her mate; and so exactly like, that it is simply impossible to tell one from the other without the minutest examination.

Buphaga africana, *bu'-fa-ga,* a curious bird, about the size of a full-grown blackbird, distributed throughout Southern Africa, and likewise found in Senegal. Its common habit is to search for its food in the infested hides of wild animals of the ox genus, as well as the rhinoceros, though its vulgar name, Rhinoceros-bird, would imply that it was exclusively attached to that animal. Its claws are well adapted for holding on securely to its hairy and animated pasturage, and its bill is shaped like a pair of wire-drawer's pliers; so that the parasite, although, as is frequently the case, nearly buried in the skin, is easily extracted. "If it rendered the rhinoceros no farther service than ridding it of these biting pests, it would deserve the animal's gratitude; but, in addition, it does him the favour of warning him of the approach of the hunter. With its ears busy as its beak, the little sentinel detects danger afar off, and at once shoots up in the air, uttering a sharp and peculiar note, which the rhinoceros is not slow to understand and take advantage of. Cumming asserts, that when the rhinoceros is asleep and the buphaga fails to wake him with its voice, it will peck the inside of his ear, and otherwise exert itself to rouse its thick-headed friend."—*Wild Sports of the World.* (*See* BEEF-EATER.)

BUPRESTIDÆ, *bu-pres'-ti-de*, (Gr.,) a genus of hard-shelled beetles, generally very beautiful in appearance. Green would seem to be their most ordinary colour, but many are of the richest azure, spangled with gold-colour : some are vivid red, and others of a glowing copper hue. They are found on the trunks and branches of trees, and, when disturbed, will fall to the ground seemingly without life, and by this means frequently escape. There exist nearly five hundred of this genus, but not more than twenty are commonly met with in this country.

BURBOT, *ber'-bot*, (*Gadus lota*,) an eel-like fish found in many northern English lakes and rivers. It is said, however, to attain greatest perfection in the Lake of Geneva.

BURNET MOTH, *ber'-net*, a beautiful day-flying moth, belonging to the family Anthroceridæ. Its wings are deep velvet green, spotted with scarlet.

BURSÆ MUCOSÆ, *bir'-se mu-co'-se*, (Lat., mucus-bags,) in Anat., are small membranous sacs, situated about the joints of the bones, and containing a kind of mucous fat, which serves to lubricate the joints, in order to render their motion easy. They are of different sizes and firmness. *Bursalogy* is the name given to a description of the *bursæ mucosæ*.

BURYING-BEETLE, (*Necrophorus*,) a genus of Coleoptera, found in Europe and North America. They have received their name from a remarkable habit they have of burying the bodies of dead birds, mice, moles, and other small animals, in which they deposit their eggs. One of the commonest species is a native of Britain, the *Necrophorus Vespillo.* It is a black beetle about an inch in length, and has two bright orange bands across the back. It has an intensely fœtid odour, and the hands smell for hours after touching it. In some parts of Russia, where poor people are buried only a few inches beneath the surface of the ground, the burying-beetles pierce the graves in every direction. In this country they feed upon putrefying dead bodies and the garbage that is thrown out near towns, as soon as it begins to smell. They hunt in couples, and as soon as they find a dead bird or mouse, they alight upon it, and, after feeding, the male commences his work of interment. This is done by digging with his head alone a trench round the dead object ; a second trench is then dug within the first, and then another, until the earth is entirely excavated. The dead bird or mouse then falls into the hole thus formed. Much time and labour are expended in this work. As soon as the corpse is fairly dragged to the bottom of its grave, the beetle quickly throws back the removed earth, and both insects bury themselves in the body. After the female has deposited her eggs, the pair work their way out. The eggs are quickly hatched. The larvæ are whitish, with six feet and a brownish head. When perfect insects, they make holes in the ground, and work their passage to the outer air.

BUSHMASTER, popular name for one of the most venomous serpents of Guiana, (*Lachesis mutus.*) It is one of the largest poisonous snakes, sometimes reaching fourteen feet in length. It has other names, such as Curucuru and Counacouchi. (*See* Waterton's Wanderings.)

BUSTARD, *bus'-tard*, (Fr. *bistarde.*)—This is the largest of European land birds. When full grown, the great bustard (*Otis tarda*) weighs from twenty-five to thirty pounds. It is about four feet long, and across its extended wings measures three yards. The head and neck are ash-coloured, and there is a tuft of feathers about five inches long on each side of the lower mandible. The bustards generally live in open countries dotted with low bushes, a locality which gives them the advantage of a broad look-out, and secures them from surprises by enemies. They are said seldom to use their wings for aerial locomotion, but as adjuncts to their long legs in running. The speed they make this way is considerable, and may be sustained a very long time. The bird is still found in parts of France and Germany, and is common in Russia and on the extensive plains of Tartary. In this country, however, it has long been rare. Yet that they were sometimes common is certain, so common as to be a looked-for dish at feasts and banquets. A living and reliable naturalist speaks of the circumstance being in his remembrance, of seeing one, and sometimes two, bustards gracing the Christmas board of the Bush Inn at Bristol. In 1799, a bustard was taken alive on Salisbury Plain, and, according to Stanley, the latest authentic instance of a capture of this bird is that of a gamekeeper in Norfolk, who took a hen bustard in a rabbit-trap, in May 1829. One of the bustard's chief peculiarities is a singular pouch, shaped like a modern soda-water bottle, and hanging immediately beneath the base of the lower mandible. The real use of this pouch has not been ascertained. Douglass supposes that the bird fills it with water in the midst of the arid plains over which it is accustomed to wander ; but as the pouch is peculiar to the males, this would seem at least improbable. Bewick has his opinion on the subject, and Stanley has his ; but what can be said when Mr Yarrell, one of our best and most painstaking naturalists, hints broadly that it is altogether a blunder—that he has dissected a male bustard, and discovered *no pouch at all.* With regard to the food of the bustard, a great diversity of opinion exists. Pennant declares their food to consist of corn and other vegetables that grow in their neighbourhood ; Brooks asserts that their proper food is frogs, mice, small birds, and various kinds of insects ; and Montagu, that vegetables (especially turnip-tops) and earthworms form the staple of the bustard's aliment. The little bustard, (*Otis tetrao*,) though common in France, Sardinia, and Italy, is very rarely seen here ; it is also found in North Africa, Turkey, and Greece. It is about eighteen inches in length. It is a very shy bird, and when disturbed, escapes by alternately running and flying. There are several other bustards, all of which are highly valued as game, such as the houbara of Algeria, and the coran and pauw of Southern Africa.

BUTCHER-BIRD, (*Lanius excubitor.*) — The sanguinary title of this member of the Shrike family, received from Gesner two hundred and fifty years ago, arises not only from its savage and cruel disposition, which seems to lead it to kill for the pleasure of killing, but also from its singular habit of impaling its victims on thorns and twigs, and in that position tearing and devouring their carcases piecemeal. All small birds have the strongest antipathy to the butcher-bird, and will express their rage and fear by the loudest cries should one appear in their neighbourhood. It is about the size of the common thrush. Its bill is black, and furnished with bristles at the base; the upper parts of its plumage pale blue, and its underparts white. It is common all the year in France, but in this country is only a rare winter visitant. When confined in a cage, the same love of fixing its food before it tears it to pieces is discovered, and for this purpose the bird usually avails itself of the wires of its prison, to which it hangs its dead captive. A bird of this species remained in the possession of a friend of Mr Yarrell for twelve months; it became very tame, and would readily take food from its master's hands. When a bird was given to it, it invariably broke the skull and ate the brains first. It sometimes held its prey in its claws and pulled it to pieces in the manner of the hawks, but seemed to prefer forcing part of it through the wires of its cage and pulling at it. It always hung what it could not eat to the sides of its cage. It would often eat three small birds in a day. Another of these shrikes, (*Lanius collaris,*) a native of Southern Africa, exhibits this carcase-suspending propensity in as marked a manner as the above. The Hottentots assured Le Vaillant that this bird does not prefer fresh food, and that its motive for hanging its carcases was much the same as prompts some of us to hang venison and game. A curious result sometimes follows this habit of the African shrike. Beneath the scorching sun of that region the process of decomposition does not always take place, from the rapid exhalation of the animal moisture; consequently, the trees and shrubs are sometimes found bearing amongst their fragrant buds and blossoms many ready-dried specimens of the small birds of the country.

Buteo, *bew'-te-o*, a genus of predacious birds, including the true buzzards.

Butterfish, one of the popular names for the spotted gunnel, (*Centronotus gunnelii.*) It is so called on account of a mucous secretion, which thickly covers the body and makes it very slippery to the touch. Another popular name is Swordick.

Butterfly, *but'-ter-fly*, (so named from the colour of the yellow species; Sax. *buterflege,*) the name of an extensive group of the order Lepidoptera which fly by day. They are distinguished from other insects by these generic characters:—The antennæ are terminated by a knob, or at least are somewhat suddenly thicker at the extremity; by the beauty as well of the under as of the upper side of their wings, which are usually erect when the animal is in a state of repose. They possess four wings, covered with minute scales, which to the naked eye appear like powder. "If you divide the wing of any butterfly, which you may easily do by scraping it on both sides with a penknife, you will be amused to trace the lines in which the scales were planted, consisting of innumerable minute dots; the lines of the under side, in some cases, so cut those of the upper side as by their intersection to form lozenges. With regard to the position of the scales on the wing, they usually lie flat, but sometimes their extremity is incurved."—(*Kirby and Spence.*) The number of British Papilionidæ is not more than seventy, and at least two-thirds of this number are to be met within five-and-twenty miles of London; and it singularly happens, that some of these affect particular localities, sometimes of an area of but a few acres, and are never elsewhere seen. Even on such favourable spots their appearance is limited to a few days in a certain season of the year. Another peculiar circumstance in the history of these insects is, that several species appear in certain localities, at intervals of several years, when they will literally swarm; come the next season, and not a solitary one will reward the most diligent searcher. This might be attributed to the variable character of our climate, but it is well known that in tropical countries the same irregularities occur. The external form of the chrysalis varies according to the species of butterfly that inhabits them; in all, however, there are apertures opposite to the thorax, by which respiration is carried on during the whole period of their inactive state. When the entombed creature has acquired sufficient vigour, and the down already grown upon it has separated it on all sides from the shell, the latter is broken through by the insect's head, and it emerges a butterfly. At first, however, the wings are closely folded to its body; but they soon expand of themselves, and are sufficiently hardened by the air to endure the effort of flying. It, however, is not every chrysalis that becomes a butterfly, probably not a thousandth part of their number do. Both in a caterpillar and in a perfect state they are surrounded by ever-hungering enemies. Many species of the Ichneumonidæ perforate the body of the caterpillar and there deposit their eggs; and although the caterpillar continues to live, and is transformed into a chrysalis, no butterfly is produced from it, those internal parts which were essential to its perfection being consumed. Sparrows and other birds are mortal foes to butterflies, and a single pair will easily dispose of between three and four hundred in the course of a single week.

Butthorn, *but'-thorn*, popular name for one of the starfishes, *Asterias aurantiaca.*

Buzzard, *buz'-zard*, a group of predaceous birds called *Buteoninæ.* The true buzzards are classed in the genus Buteo. The typical species is the common buzzard, (*Buteo vulgaris,*) a bird which was once plentiful in England, but is now almost extinct, only surviving in the great forests and uncultivated districts. Its colour is rich brown on the back, and the chest and abdomen are grayish white, streaked with brown. The bill is bluish black. The length is about twenty-two inches. Although belonging to the falcon tribe, there is an owlish cast about the buzzard that is very perceptible; its plumage being soft and downy, instead of stiff and close like that of the true falcon. Owing to its short wings, it is not capable of chasing the more active birds, but contents itself with pouncing on them suddenly, the soft downy plumage allowing it to do so without alarming the prey by the rushing sound of feathers through the air. This inaptitude for chase caused it to bear but a poor reputation among the old falconers, who used to employ the name of buzzard as synonymous with laggart or coward. Another allied bird, the Honey

Buzzard, (*Pernis apivorus,*) inhabits England. It derives its name from its insect-eating propensities, it being very fond both of bees and their combs. But it does not attempt to live wholly on bees, as its existence would not be much prolonged under such circumstances. Insects of all kinds, and in every stage of development, are eaten by the honey-buzzard, which is very clever at finding them and dragging them from their concealment. The wasp's nest is a great prize for the honey-buzzard, which tears the comb to pieces and devours the young without paying any heed to the stings of the proprietors. Even the underground nest of the wasp is often dug up by the honey-buzzard, although it scarcely seems capable of undertaking such a task. It also feeds on birds, small mammalia, and reptiles, having been known to eat coots, lizards, frogs, and mice. But whenever a honey-buzzard is killed and opened, its stomach always contains relics of insects. This bird is more nearly allied to the kite than to the buzzard. It seldom builds a nest for itself, preferring to usurp that of some other birds. Sometimes, however, it is sufficiently industrious to make its own nest, as is mentioned by several observers. White, in his *Natural History of Selborne*, tells of "a pair of honey-buzzards that built them a large shallow nest, composed of twigs and lined with dead beechen leaves, upon a small, slender beech, near to Selborne Hanger. In the middle of the month of June, a bold boy climbed this tree, though standing on so deep and dizzy a situation, and brought down an egg, the only one in the nest. The egg was smaller and not so round as the egg of the common buzzard, and was dotted at each end with small red spots and surrounded in the middle with a broad and blood-red gore."

Buzzard Turkey, a popular name for the carrion vulture of America. *Catharista aura*, a bird that is called in Jamaica the John Crow.

Byrrhus, *bir'-rus*, a genus of the order Coleoptera. This insect is about the size of the lady-bird, is of a deep brown colour, with its wing-shells marked by black lines. It is commonly found in gardens.

C

Caama, *kay'-am-mah*, (*Vulpes caama,*) sometimes called the Asse. This is a very small species of fox, inhabiting Southern Africa. The fur of it is largely used by the natives for the purpose of making their karrosses or skin cloaks. It feeds much on the eggs of the ostrich, breaking them by rolling them forcibly against each other.

Cabbage-Fly, *kăb'-baj*, (*Anthomyia Brassicæ,*) an insect of the same genus as the beet-fly and the turnip-fly, Its larvæ feed upon the roots of cabbage, and often do great injury. It is about a quarter of an inch long, and the expanse of its wings is about half an inch. The colour of the male and female is dark gray. The face of the male is silvery gray, with a dark streak on the forehead; the abdomen is linear, and the eyes nearly meet together on the crown of the head. The face of the female is whiter than that of the male, and there is no dark streak on the forehead; the eyes are wide apart, and there is a broad black stripe between them; the abdomen of the female also terminates conically. The larvæ, which are yellowish-white in colour, closely resemble those of the common flesh-fly.

Cabrit, *kăb'-reet*, a name for the prong-horned antelope of North America, (*Antilocapra Americana.*) It bears some resemblance to the chamois. It may be known by the peculiar prongs projecting from the curve of each horn.

Cachalot. (*See* Sperm Whale.)

Cacajao, *kah-kah-hah'-o*, a name for the black-headed saki. (*See* Saki.)

Cacatua. (*See* Cockatoos.)

Caccabis, *kak'-kă-bis*, a genus of gallinaceous birds, allied to the partridge. The red-legged partridge belongs to this genus.

Cacicus, *kas'-si-kus*, a genus of American birds, allied to the starlings, and popularly called Cassiques. They make beautiful pensile nests.

Caddis-Worm, *kăd'-dis*, the common name of the species of Phryganea which reside in the water in cases, which they form of various substances, such as bits of stick, grains of seed, small stones, &c., held together by a silken thread, secreted in their bodies in the same manner as in the silkworm. The perfect insect, the caddis-fly (*Phryganea grandis,*) has a body of a leathery consistence, and thickly clothed with hair; head small, with semi-globular eyes; antennæ as long as the body; anterior wings elongated, lanceolate in the females, but rather more obtuse in the males. They are very active, moving with a gliding motion; but their flight is awkward. They frequent damp and marshy situations. When handled, they emit a very unpleasant odour. Their colours are ordinarily brown or gray.

Cæcilia, *see-sil'-li-a*, a genus of false snakes, allied to the crawling batrachia. The skin is smooth, with embedded scales, and the limbs are absent. They inhabit Africa and America.

Cajote or **Cayote**, *kay'-yote*, a small American wolf, looking something like a large half-starved fox.

Calamary. (*See* Cuttle.)

Calandra, *kăl-ăn'-dra*, a genus of coleopterous insects belonging to the Curculionidæ. The corn-weevil (*C. granaria*) is included in this genus. In its perfect form this little beetle is of a reddish-brown colour, about an eighth of an inch long; has a slender snout slightly bent downwards, a closely-punctured and very long thorax, and furrowed wing-covers, that do not entirely cover the tip of the abdomen. It bores a hole into the grain with its proboscis, in which an egg is deposited. The egg turns into a tiny grub, which devours the whole inside of the grain, leaving the husk entire. Wheat and other grain may, therefore, be much damaged without presenting a bad appearance. If the true state of the case, however, should be suspected, there is a very simple test. A handful of the suspected grain is thrown into a pan of water, when the hollow husks at once float on the surface, and the sound grains sink to the bottom. It will afford some idea of the formidable character of these tiny beetles, to state as an ascertained fact, that one female is capable of producing six thousand of her kind in a single year.

Calappa, or **Box-crab**, (*Camara calappa,*) *kăi-lăp'-pa*, a genus of crustacea, inhabiting the seas of the Indian Archipelago, the Pacific and Atlantic Oceans, and the seas of South America. One of this family (*Camara granulata*) is an inhabitant of the Mediterranean, and, according to Prisso, is found most frequently in the fissures of rocks, at a depth sometimes of a thousand feet. Their general colour is pale rose, with whitish feet and brown nails.

CALATHUS, *kal'-ă-thus*, a genus of coleopterous insects belonging to the section Geodephaga. Upwards of twenty species of this genus of ground-beetle are found in Europe.

CALAMODYTA, *kăl-ă-mo-die'-tah*, a genus of warblers. The grasshopper and garden warblers belong to this genus.

CALIGUS, *kay-lie'-gus*, a genus of parasitic crustacea found in the codfish and brill.

CALLIANASSA. (*See* MUD-BURROWER.)

CALLIDIUM, *kăl-lid'-i-um*, (Gr. *kallos*, beauty, *eidos*, form,) a genus of small beetles, infesting houses, and very destructive to woodwork, especially of spruce and fir. One of this family, (*Callidium bajulus*,) a flattish, rusty-black insect, will, according to Messrs Kirby and Spence, not only eat their way through the rafters of a house, but even bore through sheet lead ; fragments of lead having been found in their stomachs.

CALLIMORPHA, *kal-li-mor'-fah*, a genus of moths of the family Lithosiidæ. The cinnabar moth belongs to this genus.

CALLITHRIX, *kăl'-li-thrix* a genus of American monkeys belonging to the family Cebidæ.

CALLORHYNCHUS. (*See* CHIMÆRA.)

CALOCAMPA, *kay-lo-cam'-pa*, a genus of night moths, of which the sword grass moth is a good example.

CALOCARIS, *kay-lo'-kar-is*, a genus of shrimp-like crustacea belonging to the family Thalassinidæ. They live at a vast depth from the surface, and burrow in the sand. They have only the rudiments of eyes. Specimens are usually obtained from the stomach of the rays and other mud-loving flatfishes.

CALYMENE, *kăl-e'-mene* (Gr. *kekalumene*, concealed,) in Geol., a genus of trilobites, so named from the obscurity which long hung over the real nature of these fossil crustaceans. The genus belongs to the Silurian system, and is particularly well represented in the Ludlow rocks. It is distinguised by its ovate, convex, and deeply-trilobed shell or crust, which is occasionally found coiled up like the *oniscus*, or woodlouse. The most abundant species is *C. Blumenbachii*, which has long been known as the Dudley locust. (*See* TRILOBITE.)

CALYPTORHYNCHUS. (*See* COCKATOO, BANKSIAN.)

CALYPTRÆA, *kay-lip'-tree-a*, a genus of limpets, popularly called Bonnet-shells. One well-known species is termed the cup and saucer limpet, because it has an interior shell that looks something like a cup, the original limpet doing duty for the saucer.

CAMALAEO. (*See* IGUANA.)

CAMARA. (*See* CALAPPA.)

CAMEL, *kăm'-el*, (Lat. *camelus*,) of this genus of mammiferous ruminants there are two species —1. the common camel, (*Camelus bactrianus;*) 2. the Arabian camel, or dromedary, (*Camelus Arabicus.*) The first is principally distinguished by its humps being two in number, whilst the dromedary has but a single hump. The latter species is distributed over an immense extent of country, being found in Arabia, Persia, Southern Tartary, Egypt, India, and the Canary Islands. The common camel is not nearly so abundant, and its geographical range much more limited. It is principally found north of the Taurus and the Himalaya Mountains. The structure of the camel is beautifully adapted to its various uses, and presents one of the most splendid pieces of Nature's mechanism. Its personal appearance is anything but fascinating, and, certainly, it would be more attractive on the score of curiosity than admiration. Practically, however, the camel affords a good illustration of the truth of a certain old proverb, implying that good looks are not *always* a proof of utility. The camel is distinguished from all other ruminants, except the llama, by having incisor teeth. The upper jaw contains sixteen teeth,—two incisors, two canines, and twelve molars; the lower jaw, six incisors, two canines, and ten molars—eighteen in all. The upper lip is swollen and divided, the nostrils slit obliquely, the neck elongated, the head long, the eyes very prominent, and the ears somewhat small. The legs of the camel are long, weak-looking members, terminating with two hoofs or toes, padded with soft cushions underneath, which enable the animal to walk securely on the soft sands of the desert. The stomach of the camel is a curious construction, and enables the "Ship of the desert" to carry a supply of water wherewith it may refresh itself on its terribly long and tiresome journeys over immense tracts of parched and sandy desert, where, for days and weeks sometimes, not a drop of water is attainable. The services of the camel to the wandering tribes of Arabs, and other inhabitants of the East, cannot be too highly appreciated, or, indeed, understood, by the people of civilised nations. The usual load of a caravan-camel is about five hundredweight ; but, on extraordinary occasions, a strong camel will carry a thousand pounds ! It will travel, when lightly loaded, about three miles an hour. The usual travelling speed of a caravan is eighteen miles a day. The Arabian camel is much the more valuable animal, as it can go without water for double the period that is endured by the Bactrian species. The swift breed of camel, to which the title of dromedary more properly belongs, is not used for carrying burdens, but for the saddle. A good Heirie dromedary will run for twenty hours together at a pace of ten miles an hour. The movement of the camel is very rough, and none but a trained rider can endure the fatigue of a day's journey. The only part of Europe in which this animal is found is at Pisa, in Tuscany. The date of the introduction of the camel into Europe is unknown. The usefulness of the camel as a beast of burden was not unknown to the ancients. In the Scriptures we frequently find allusions to the camel ; the three thousand of these animals belonging to Job forming a considerable portion of his property. In the Book of Genesis their are several pertinent notices of the camel, which, even according to Jewish chronology, would at least prove that this animal was a domesticated and useful servant of man four or five thousand years ago. At what remote period the camel roamed at large, wild and free, is uncertain. The earliest writers make scarce mention of "wild camels;" and when they do so, it is not at all unlikely that allusion is made to animals which, on some occasion, have escaped from bondage, or been set free. The names of the camel in different countries are all very similar. The Hebrew name is *Gamal;* it is the *Djemal* of the Arabs; *Camelo* of the Italians; in France, *Chameau;* in Germany, *Kamel.*

CAMELOPARD, *kăm-el'-o-pard,* (Lat. *cæmelus,* camel; *pardalis,* panther,) more properly called the GIRAFFE. This graceful giant was, till within the last century, not only little known in this country, but its very existence was doubted; and no marvel, when its extraordinary proportions are considered. "Who can wonder at the incredibility of the people? 'I have seen an animal,' said the traveller, 'with the skin of a leopard, the head of a deer, a neck pliant and graceful as the swan's, so tall that three tall men, mounted on each other's shoulders, could no more than touch its forehead, and yet so gentle and timid withal, that the merest cur barking at its heels would put it to its utmost speed, which exceeds that of the hare or greyhound.'"—(*Wild Sports of the World.*) These, moreover, are not all the wonders connected with the animal in question. What the elephant's proboscis is to it, as regards a grasper and a feeler, so is the camelopards tongue to it. Its oblique and narrow nostrils are protected by a curious fringe of bristles, which it can at pleasure draw together, to the exclusion of the fine sand that the suffocating storms of the desert raise in clouds. Its full and lustrous eyes are so wonderfully appointed, that, without moving its head, it can see behind, before, above; and thus defy the stealthy approach of its enemies. The legs of the camelopard have a curious, not to say awkward appearance. The first impression one receives on regarding them, is that the hind ones are shorter than the fore. This is, however, illusory, and probably arises from the fact of the animals neck stretching nearly in a line with its back, owing to the very great length of the shoulder blades. In running, the hind legs are lifted alternately with the fore, and are carried outside and far beyond them, while the long tail, tufted at the end like that of the buffalo, is curled above the back, and swings pendulum-fashion exactly as the neck moves. From forehead to forehoof the full-grown buck measures eighteen feet, while the female, which is more slender than the male, measures about three feet less in height. Hunters describe the flesh of the camelopard as being slightly scented with the perfume of the mokaala and other flowering shrubs on which it feeds. Gordon Cumming, however, makes mention of a still more extraordinary circumstance,—that the living body of the animal emits a delicious perfume. "No pen, or words, convey to a sportsman what it is to ride into the midst of a troop of giraffes. They emit a powerful perfume, which, in the chase, comes hot on the face, reminding one of the smell of a hive of heather-honey in September."—(Cumming's *Five Years in Southern Africa.*) They congregate in herds of from twelve to twenty; though at times as many as thirty, and even forty, have been seen in company.

CAMPAGNOL, *kam-pan'-yole,* a name in which are included the field vole and the bank vole. (*See* VOLE.)

CAMPANERO. (*See* BELL-BIRD, ARAPUNGA.) This is one of the chatterers, and inhabits the deep forests of Southern America. It has a movable horn on its head, and its cry is like the toll of a large bell.

CAMPANULARIA, CAMPANULARIDÆ, *kăm-păn-u-lai'-ri-a,* a genus and family of zoophytes. This division is thus characterised by Dr Johnston: "Polypidom plant-like, horny, rooted by a creeping tubular fibre, branched or simple; the polypæ cell thin and campanulate, terminal, elevated on a ringed footstalk disposed either alternately or irregular." The above authority also mentions having seen the antennæ of a crab so completely invested with this zoophyte as to resemble hairy brushes, the coralline in this instance having chosen a station by which it obtained all the benefits of locomotion.

CAMPEPHILUS. (*See* WOODPECKER, IVORY-BILLED.)

CAMPOSCIA, *kăm-pos'-si-ah,* a genus of sharp-beaked crabs, and allied to the spider-crab. The antennæ are partly feathered. It is found off Mauritius.

CANARY-BIRD, *kă-nai'-re,* (*Carduelis canaria.*)—This popular and pretty singing-bird is a native of the Canary Islands. Its introduction into Europe was somewhat singular. According to some authorities, at the end of the 14th century, and to others, at the beginning of the 16th century, a vessel containing, among other merchandise, a number of canary-birds, and which was bound for Leghorn, was wrecked on the coast of Italy. The birds, being set at liberty, took refuge in the adjacent island of Elba, and the climate being congenial to their habits, they increased considerably. The islanders, finding such an elegant songster suddenly settling in their country, were anxious to become possessors of them, and quickly the whole colony of canaries were taken prisoners. From Italy they were brought to other countries, and became highly valued as singing-birds. The wild bird of the Canary Islands and the domesticated bird so familiar in this country are quite at variance in personal appearance. The colour of the wild canary is a dusky gray; whereas, in the domesticated canary, we have a great variety of colours,—green, yellow, white, brown, gray, &c. This is, of course, owing to the numerous cross-breedings this species has been subjected to. It breeds freely with several other species; the gold finch, the bullfinch, the siskin, the greenfinch, and the linnet, among the number. Altogether, it is reckoned that there are no less than thirty varieties of the canary. The best authority on the subject says—"Those canaries that have the upper part of the body of a dusky green or linnet-brown, and the under-part the yellowish-green of the green-bird, with dark-brown eyes, are the strongest, and most nearly resemble the primitive race. The yellow and the white have often red eyes, and are the most tender. The chestnut are the most uncommon, and hold a middle rank for strength and length of life between the two extremes. The canary that is most admired amongst us now is one with the body white or yellow; the head, (particularly if crested,) wings, and tail, yellowish-dun. The second in degree is of a golden yellow, with the head, wings, and tail black, or, at least, dusky gray. Next follow the gray or blackish, with a yellow head and collar, and the yellow, with a blackish or green tuft, both of which are very much valued. As for those that are irregularly spotted, speckled, or variegated, they are much less sought after, and are used to pair with those of one colour—white, yellow, gray, brown-gray, and the like."—(Bechstein's *Cage-Birds.*) In Germany and the Tyrol, the breeding of this bird is carried on on an extensive scale, and it is principally from these places that the rest of Europe is supplied. In its native home, the canary builds its nest in thick, bushy, high shrubs, and trees, with roots, moss, feathers, hair, &c. ; pairs in February, lays from four to six pale-blue eggs, and hatches five and often six times in the season. Bechstein gives the following directions for getting and keeping good canaries :—"The most essential is to choose from among the young that which promises a fine tone, and to seclude it from all other birds, that it may learn and remember nothing bad. The same precaution is necessary during the first and second moulting ; for, being likely to relearn, if I may say so, its song, it would introduce into it, with equal ease, foreign parts. It must be observed whether the bird likes to sing alone or in company with others ; for there are some which appear to have such whims, liking to hear only themselves, and which pout for whole years if they are not humoured on this point. Others sing faintly, and display their powers only when they can try their strength against a rival. It is very important to distribute regularly to singing-birds the whole allowance of fresh food which is intended for the day. By this means they will sing every day equally ; because they will eat uniformly, and not pick the best one day, and be obliged to put up with the refuse the next. About two spoonfuls of dry food is sufficient for the daily nourishment of a canary."

CANCERIDÆ, a family of short-tailed crustacea, having the carapace wider than long, and the legs not formed for swimming. (*See* CRAB.)

CANCROMA. (*See* BOAT-BILL HERON.)

CANDA, *kan'-dah*, a genus of Polyzoa, belonging to that forming Cellularidæ, having no sessile avicularia.

CANIDÆ, *kain'-id-ee*, (Lat. *canis*, a dog,) a term in Zool., used to distinguish the Dog tribe, which includes dogs, wolves, jackals, and foxes. There are many varieties of dogs, most of which are clearly defined. Of all the inferior animals, the dog is the greatest friend and companion of man. In the south-east of Europe, and in parts of Asia, the dogs have no masters, and prowl about the towns and villages, living upon carcases and offal. The Mohammedans and Hindoos look upon them as impure, and will not touch them without an ablution. Putting aside these exceptions, it is certain that dogs have been domesticated and attached followers of man in all ages. In the monuments of Egypt and Etruria, several species of domestic dogs are represented ; and in one of the Nineveh sculptures brought to this country by Layard, is a magnificent specimen of a mastiff. There are several varieties of wild dogs in India, and in Australia there is a very savage wild dog, called the Dingo, which bears a strong resemblance to the wolf. It is now generally acknowledged that the Dingo is not indigenous to Australia, but is an introduced animal run wild. Naturalists are not agreed as to the parent stock of the dog ; some consider that it is derived from the wolf, while others trace it to the jackal : no trace of the breed, however, is to be found in a primitive state of nature. Where dogs have been met with wild, they have never shown a tendency to return to the form either of the wolf or the jackal. Dogs have been found in a fossil state. The wolf was formerly a native of Great Britain ; it is now extirpated, but still infests the western countries of Europe. In all its varieties, the wolf is a cruel and cowardly animal. The jackals are gregarious animals, which hunt in packs, and prey upon smaller mammalia and poultry. Their long-protracted screaming cry at night is peculiarly disagreeable. They are natives of India, and are found also in great numbers in Syria. The fox is a native of Europe, America, and Northern Asia. Its cunning and sagacity are proverbial. It is preserved in Great Britain, and affords great diversion to the sportsman. The family Canidæ belongs to the class Mammalia, order Feræ. (*See* DOG.)

CANNA, *kan'-nah*, a name for the Eland, *q. v.* Canna is also a term in botany, used to designate a genus of plants, from some of which the arrowroot of commerce is obtained.

CANTHOCAMPTUS, *kan-tho-cam'-tus*, a genus of Entomostraca, having the thorax and abdomen fused together and modified with a tail, which can be turned over the back.

CANTHARIDÆ, *kăn-thăr'-e-de* (Gr. *kantharos*, a beetle,) the name given to a family of coleopterous insects, very numerous, much variegated in colours, of moderate size, and generally living on vegetable substances. They are distinguished by the head being dilated behind the eyes, and then suddenly narrowed into a short neck. When alarmed, they counterfeit death ; and some varieties at the same time emit a thick yellowish fluid, with a disagreeable smell, from the articulations of the legs, &c. Many species are employed externally in medicine to produce blisters, as they possess strong vesicating powers. They are also used internally as a powerful stimulant. Many species of the genus Cantharis which possess this property are natives of Europe, India, and America. The *Cantharis vesicatoria* is the common blister-fly of the shops. (*See* BLISTER-FLY.) The striped cantharis is a native of North America, where it is called the Potato-fly. The genus Mylabris contains several species, which have properties similar to those possessed by the cantharis ; and the genus Meloe has also various species which have all the properties of the blister-fly.

CAOUNE. (*See* LOGGERHEAD TURTLE.)

CAPERCAILZIE, or CAPERCAILIE, *kă-per-kail'-ze*, (*Tetrao urogallus*,) a bird of the Grouse species, whose appellation is of Gaelic origin, and means "horse of the wood ;" it is also called the Cock of the wood. Formerly, this magnificent bird was an inhabitant of the British isles, being principally found in the Highlands of Scotland, but has been for some time extinct there. It prefers the pine forests of Norway and Scandinavia, in which regions it is found in abundance. Several attempts have been made to introduce this bird again into Scotland, but without any satisfactory results, although the soil and nature of the country are well adapted to the purpose. As it is, a larger number of capercailie may be found in the regions of Leadenhall than in any other part of the United Kingdom. The food of the capercailie consists of the leaves of the Scotch fir, also various berries found in the North. The young have a more luxurious diet, feeding on ants, worms, and other insects. The size of this species varies considerably ; in some cases a full-grown male (which is one-third larger than its mate) will scarcely weigh ten pounds; whereas it will sometimes exceed sixteen pounds. This discrepancy is greatly owing to the latitude in which it is found. In length it usually measures about two feet ten inches. The capercailie may lay claim to considerable beauty. Not until it is three years old is it fully developed, and then it exhibits an eagle-like grandeur and boldness, beside which every *Gallus domesticus* sinks into insignificance. Its plumage is beautifully glossy, mottled with gray and brownish-black, the neck and breast, black tinged with a rich green. The female's attire is humbler, and is variegated with yellowish-brown, white, and brownish-black. It would seem a pity that vigorous attempts were not made once more to introduce the capercailie into the United Kingdom.

Capeuna, *ka-peu'-na,* a fish found in the Mediterranean, and sometimes called the Four-streaked Red-throat, because the throat is red, and four stripes of brown and yellow run along the body. Its scientific name is *Hæmulon quadrilineatum.*

Caphyra, *kă-fy'-ra,* a genus of small crabs found in scallops, and resembling the pea crabs.

Capocier, *ka-pŏs'-si-ai,* a warbler belonging to the genus Drymoica, and a native of South Africa. It makes a beautiful nest of white cottony down, something like that of the long-tail titmouse.

Caprella, *kă-prel'-la,* a genus of sessile-eyed crustacea, popularly called Mantis-shrimp, from their resemblance to the mantis insect.

Capra, the Goat. (*See* Goat.)

Capreolus. (*See* Roebuck.)

Caprimulgus. (*See* Goatsucker.)

Caprovis, *kaip-ro'-vis,* a genus of sheep, including the Argali, or giant sheep of Siberia.

Capucins, *kap'-u-chins,* a group of American monkeys, including the Sapajous, Sai and others, *q. v.*

Capybara, *kaip-i-băh'-ra,* (*Hydrochœrus capybara.*)—This rodent animal is found in the south of America, and in general appearance greatly resembles a small pig. It feeds on vegetables. It is remarkable for being the largest rodent that is known to inhabit the earth. "They occasionally frequent the islands in the mouth of the Plata, where the water is quite salt, but are far more abundant on the borders of fresh-water lakes and rivers. In the daytime they either lie among the aquatic plants, or openly feed on the turf-plain. . . . . Both the front and side view of their head have quite a ludicrous aspect, from the great depth of their jaw. The animals I saw at Maldonado were very tame: by cautiously walking, I approached within three yards of four old ones. As I approached nearer and nearer, they frequently made their peculiar noise, which is a low, sharp grunt, not having much actual sound, but rather arising from the sudden expulsion of air. The only noise I know at all like it is the first hoarse bark of a large dog. Having watched the four from almost within arm's length (and they me) for several minutes, they rushed into the water at full gallop with the greatest impetuosity, and emitted at the same time their bark. After diving a short distance, they came again to the surface, but only just showed the upper part of their heads. When the female is swimming in the water, and has young ones, they are said to sit on her back."—(*Darwin.*) The flesh of the capybara is esteemed a dainty by the jaguar, which preys largely upon this animal. The way in which it captures the capybara is very singular. It is said that, leaping to the back of the doomed animal, the jaguar, by a rapid movement of the fore-paws, twists its head round and breaks its neck.

Carabidæ, *kă-răb'-i-de,* (Gr. *karabos,* a beetle,) a family of coleopterous insects, comprising a vast number of species. The principal characteristics are given as follows:—Anterior tibiæ without emargination on the inner side; head narrower than the throat; eyes rather prominent; palpi with the terminal joints often compressed, large, and somewhat triangular in shape; mandible simple, moderately long, and rather thick. In general, the members of this family prey upon insects; and the construction of their bodies is eminently adapted for this purpose, being very firmly encased in a stout covering, enabling them to search among the stones, crawling over and under them for their prey without fear of hurt; at the same time they can suffer but little from the attacks of other insects. Some species of the Carabidæ are, it has been ascertained, herbivorous, finding their food principally in the cornfields. In the British Museum may be found a splendid collection of these insects. They are popularly called Ground Beetles.

Caracal, *kă-ră-kăl',* (*Felis Caracal,*) sometimes called the Persian lynx, is found in both the continents of Asia and Africa. This animal is the lynx of the ancients. It is about three feet in length, of a pale reddish-brown above, and whitish beneath. It has a small head, although somewhat elongated, and small ears. In disposition it is fierce and savage, which, combined with great strength, renders it no mean antagonist. Such qualities, which would, in its wild state, make it rather an inconvenient and troublesome animal to the natives, are turned to good account by employing its services in the chase of other animals and birds, in which pursuits it is said to acquit itself in a highly creditable manner. It is also known by the name of Siagosh, which has the same signification as the word Caracal, viz., Black ears.

Caracara, *ka-ra-kah'-ra,* a group of South American falcons, sometimes called Carrion Hawks, because in their mode of feeding they somewhat resemble the vultures. They seldom kill birds and animals for themselves, but follow hunters and eat the offal of their game, and frequent the slaughter-houses just as the vultures do in other countries. Sometimes they follow the ploughmen, and pick up the grubs and insects turned up by the share.

Caranx, *kă-ranx',* a genus of fishes allied to the Mackerel, and spread throughout many seas. There are many species of this genus, of which the cordonnier or cobbler-fish is a good example.

Carcharodon. (*See* Sharks.)

Carcinus. (*See* Crab.)

Cardiaceæ, *kar-di-ai'-se-e,* (Gr. *kardia,* the heart,) a family of bivalve mollusca. They have a thick, closed, equivalve shell, with the umbones usually bent round, so that the shell, when seen from either extremity, presents a more or less cordate appearance. The hinge-teeth are strong, from one to three in each valve, and there are usually one or two smaller teeth on each side of the hinge. The animal possesses two adductor muscles.—(Dallas's *Animal Kingdom.*) The best example of structure which specially distinguishes this group of shells, is found in the spiral heart-cockle, (*Isocardia cor.*) In this curious shell the umbones are not bent round, but have a bold spiral curve like a ram's horn. This is a British species, and not uncommon, living at a tolerable depth, and adhering firmly by means of its byssus. It can easily be procured by means of the dredge. The species of this family are very numerous, and greatly vary in size, some of their shells being remarkable for the smallness and delicacy of their construction. The type of the family is the Cockle. (*See* Cockle.)

Cardinal Bird. (*See* Grosbeak.)

Cariama, *sa-ri-ah'-mah*, a South American bird, allied to the trumpeters, and remarkable for a crest of plumes which rises from the forehead. It is a quick runner, and very wary, so that it is not caught without difficulty.

Carduelis, *kăr'-du-ĕl'-lis*, (from Lat. *carduus*, a thistle, on account of their love for the seeds of the thistle,) a genus of birds of the Finch tribe. (*See* Goldfinch, Canary, &c.)

Caretta. (*See* Turtle.)

Cariacus, *kar-i'-ă-kus*, a genus of deer, inhabiting North America. (*See* Carjacou.)

Cariboo, *kăr'-i-boo*, a handsome American deer, which is closely allied to the reindeer, and is thought by many naturalists to be only a variety of that animal. The horns are eaten when young and soft.

Carjacou, *kar'-jă-koo*, an American deer, very valuable for its flesh and hide, the latter being much used in the manufacture of hunting shirts, mocassins, and other articles of apparel.

Carinaria, *kăr-in-a'-ri-a*, a genus of nucleobranchiate molluscs, having a small shell of glassy translucence. They swim fast by means of the foot.

Carnivora, *kar-niv'-o-ra*, (Lat. *caro*, flesh, *voro*, I devour,) a term applied to all creatures which feed upon flesh. It is definitely applied to that order of the Mammalia which preys upon other animals. The forms of this order are very varied. They are furnished with three sorts of teeth, and have nails or claws upon the feet like man and the Quadrumana; but they differ from these two orders in not having the thumbs of the anterior extremity capable of being opposed to the other fingers. The modifications of the molar teeth generally indicate the kind of animal food eaten by Carnivora. Some are made for cutting or lacerating, some are serrated, and others are totally or partially tuberculated: in the latter case vegetables form a greater or less proportion of the diet. In all cases the jaws of Carnivora only open upwards and downwards, and never horizontally. The brain of these animals is considerable in bulk, well marked, but without a third lobe, and does not cover the cerebellum. Of all the senses smelling seems to be in the highest perfection; and as their food does not require much elaboration and digestion, their intestines are comparatively short. Cuvier divides the Carnivora into four tribes:—1. The Plantigrades, which are distinguished by applying the whole sole of the foot, especially the hinder one, to the ground in walking. The bear and badger are instances. 2. The Digitigrades, which have long flexible bodies and short legs. The ferret and polecat, and the fox, are instances of the two subdivisions of this tribe. 3. The Felidæ, or cats, in which the destructive power is most highly developed. They are distinguished by the short round muzzle, the shortened powerful jaw, and the retractile claws, sheathed by means of elastic ligaments when the animal is in repose. All the Felidæ have two false molars above and two below; the upper fleshcutter has three lobes and a blunt keel within; the lower one has no keel, but has two pointed and cutting lobes. They have also one small tuberculated molar above, without any corresponding molar below. The tiger is an example of this tribe. 4. The Amphibia; of which the seal is an example. Many remains of mammiferous Carnivora have been discovered in bone caverns and osseous breccia.

Carp, *karp*, (Fr. *carpe*,) (*Cyprinus Carpio.*)—This fish is found in most of the lakes and rivers of Europe, and in many places it is cultivated in ponds with great care, although not to a great extent in this country, which is, doubtless, owing to the abundance of salt-water fish. It is said that this fish was introduced into England about the beginning of the sixteenth century and it has always been greatly esteemed as a delicate article of food. The carp usually feeds on worms and various insects; this diet, however, in places where this fish is bred is intermixed with grain, &c. The length of a carp's life is amazing. A century would seem to be about the average; but a healthy fish will occasionally live to the age of 150 years, or thereabouts. When it is considered that it is an extraordinarily prolific fish, and that its roe has been known to turn the scale against the remainder of the carp out of which it has been taken, it is, perhaps, fortunate that it is so generally popular a diet. The carp usually measures about fifteen inches in length; in warm climates, however, it sometimes nearly reaches three feet. The general colour of the carp is yellowish-olive; the head is large, and the mouth is provided with two beards, one shorter than the other; the scales are large and very distinct.

Carpenter Bee, *kar'-pen-ter*, (*Xylocopa.*)—This species belongs to the Apidæ, or true bees. Its name is derived from the singular manner in which its nest is built. This is generally found in soft decaying wood, and is lined with leaves of a semicircular form cut from plants. It is also known as the Leaf-cutting Bee and Upholsterer Bee. It is found in all parts of the world.

Carpilius, *kar-pil'-li-us*, a genus of crabs having a round and smooth body, and a tooth at each side of the carapace. The Spotted Crab belongs to this genus.

Carpophaga, *kar-po'-fag-ga*, a genus of pigeons, inhabiting the Pelew Islands, and popularly called the Fruit Pigeons, because they feed on the nutmeg and other fruits, which give to their flesh a peculiarly delicate flavour. They are remarkable for a large rounded knob, which appears in the breeding season on the top of their head, and which vanishes after the young have been hatched.

Carrancha, *kar-ranch'-a*, one of the names of the Brazilian Kite.

Carrier Pigeon. (*See* Pigeon.)

Carrion Hawks. (*See* Caracara.)

Cartilaginous Fishes, *kar-ti-laj'-i-nus*, are fishes the skeletons of which are destitute of bony fibre. In some cases they would almost appear to form the connecting link between the vertebrate and invertebrate animals. The skeleton of the lancelets, for example, is merely rudimentary; it simply consists of a slight transparent flexible dorsal column. The dorsal column of the lamprey also presents a similar appearance. The centre of the backbone of the sturgeon is a column of cartilage, and the vertebræ of sharks consist of hollow cones, which have their cups filled up with the remains of a gelatinous cord. Great elasticity is the result of this arrangement. In many of the more highly organised cartilaginous fishes, several vertebræ are joined together in one piece, and the skull is formed without sutures, although the shape corresponds with that of other fishes. Cuvier placed cartilaginous fishes with the batrachian reptiles in his class *Amphibia.* Naturalists are now, however, unanimous in placing them in the class of fishes. The heterocercal tail is one of the most remarkable chararteristics of all classes of this kind of fish. The vertebral column is prolonged into the upper portion of the caudal fin, and the lower one is given off beneath. Similar tails are to be observed in the fossil fishes of the Old Red Sandstone period.

CARYOPHYLLIA, *kai-ri-o-fil'-li-ah,* a genus of zoophytes, popularly called Cup Corals They have many tentacles crowded together, and knobbed at the tips; there is a sponge-like mass of twisted plates at the bottom of the cup, and the mouth is ribbed.

CASARKA. (*See* SHIELDRAKE.)

CASCAVEL. (*See* RATTLESNAKES.)

CASSIS, *kas'-sis,* a genus of univalve molluscs, belonging to the family Buccinidæ, and popularly called Helmet Shells. They are largely used in the manufacture of cameos, their differently-coloured layers producing beautiful effects. They are inhabitants of the tropical seas.

CASSOWARY, *kăs'-so-wă-re,* (*Casuarius,*) a large and powerful bird, closely allied to the ostrich It is an inhabitant of Java and the adjacent Indian archipelago, and is generally called the Helmeted Cassowary, on account of an osseous crest or horny helmet which surmounts its head. The skin of the head and the upper part of the neck are without feathers, and of an intense blue and deep red colour. There are also two pendent wattles, partly red and partly blue, on the front of the neck. On the breast is a bare place, on which the bird rests when lying on the ground. In height it is less than the ostrich, standing little more than five feet when erect. It is, however, robustly built, and very strong. From the appearance of its eyes and the form of its head, the cassowary might be supposed to be of a fierce and threatening nature. This is not the case, as it is rather timorous and shy than otherwise. When attacked, it defends itself by kicking with its feet, and striking with its short and otherwise useless wings. All the feathers of the cassowary are of the same kind, and of the same colour: they are only designed for covering. Its whole plumage is very poorly supplied with feathers, and, at a short distance, it presents the appearance of a rough coat of coarse hair. It feeds upon eggs, fruit, and succulent herbage. The eggs of the cassowary are greenish in colour, and have a much thinner shell than those of the ostrich. This peculiar bird, which is the largest known except the ostrich, is becoming very rare in its native regions; but there are specimens to be seen in most of the menageries of Europe.

CASTOR, the Beaver. (*See* BEAVER.)

CASUARIUS. (*See* CASSOWARY.)

CAT, *kăt,* (*Felis.*)—It is not a little singular that the origin of the most important member of this family, the domestic cat, (*Felis domestica,*) should be involved in such obscurity. By the older naturalists it was supposed that it might be considered to be descended from the wild cat, (*Felis catus-ferus.*) Modern science has upset this theory by bringing a tremendous array of argument, and battering at its most vulnerable parts. In its place another theory has been substituted, and accepted generally by naturalists. It is well known that the ancient Egyptians possessed a domestic animal, which, judging from representations of it on the monuments of Thebes and elsewhere, bore a resemblance to our domestic cat. Moreover, in the British Museum there is a copy of an Egyptian painting, which is supposed to represent the cat of that country catching birds; and it is conjectured that it was trained for that purpose. This same animal has been referred to as being not unlikely the progenitor of the domestic cat; and the probability of this theory has been augmented by the discovery of a species (*Felis maniculata*) by Rüppel in Nubia. This animal is rather larger than the domestic cat, of a fine gray colour. Rüppel gave his opinion that it must be a descendant of the domestic cat of the Egyptians, and that, at some remote period, it was transferred to the Europeans by the contemporary Egyptians. This opinion has been adopted by many eminent zoologists, amongst whom may be mentioned Temminck, and Sir William Jardine in our own country; the latter, in particular, has some very ingenious remarks thereupon, which may help considerably to elucidate the difficulty connected with the origin of *Felis domestica.* There does, indeed, seem much in favour of Rüppel's theory; only, on the other hand, we have naturalists of equally heavy calibre dissenting from it. An authority whose opinion cannot be too highly estimated in all that relates to natural history thus alludes to *Felis maniculata*:—"This species, to which the high authority of Rüppel has assigned the origin of our house-cat, is still further removed from it in essential zoological character than even the British wild cat, to which it has been previously so generally referred; and that, as in the case of so many of our domesticated animals, we have yet to seek for the true original of this useful, gentle, and elegant animal."—(Bell, *History of British Quadrupeds.*) Dallas also makes a similar statement in his "Animal Kingdom." Mr Bell not only denies the correctness of Rüppel's theory, but deals a death-blow to Sir William Jardine's and other naturalists' notion of the crossing of the wild and tame cat. "It is not without much reflection on the matter," says he, "that I have come to the conclusion that this opinion of their intermixture, repeated and transmitted from one to another till it has become an uncontested dogma, is erroneous, and has its foundation in mistaken facts." This emphatic declaration from so eminent a zoologist is a little startling; but, with all deference, we must still incline to the opinion that the intermixture of the two breeds is far from improbable. It would seem that the subject of the origin of domesticated animals is fraught with considerable difficulty. It has engaged the attention of numerous zoological societies for some years, and but little progress has been made. The wild cat is found in all the wooded districts of Europe, —in Germany, Russia, and Hungary: it is also found in the north of Asia and Nepaul. In Great Britain it was at one time abundant, and met with in all the woods and forests. From a charter granted to the abbot of Peterborough, in the reign of Richard II., we learn that the wild cat was one of the animals hunted in those days. Its hide was probably not very highly valued; Archbishop Corbyl's canons (1127) ordained that the nuns and abbesses should not wear a more expensive apparel than that made of wild cats' or lambs' skins. At the present time, the number of wild cats inhabiting England is not very large, and they are principally found in the northern counties. In Ireland, and more particularly in the north of Scotland, they are still found in large numbers. Pennant's description of the wild cat is very amusing, although perhaps more applicable to the animal of his time than our own. "The wild cat," says he, "may be called the British tiger; it is the fiercest and most destructive beast we have, making dreadful havoc among our poultry, lambs, and kids. It inhabits the most mountainous and woody parts of these islands, living mostly in trees, and feeding only by night. It multiplies as fast as our common cats; and often the females of the latter will quit their domestic mates to seek the forest home of the wild species." The domestic cat is so well known that any description of it would be unnecessary. In the town and the country, in the mansion of the rich and the cottage of the poor, in the workshop of the artisan and the offices of the merchant, this well-known animal may be commonly found. It is of many colours and sizes: there is the black cat, the tabby, the tortoiseshell, the white, the slate-coloured, the blue or Chartreuse, the dun-coloured cat, and a few others, the most beautiful of which, perhaps, is that known as the Angora cat, with its long silky hair. As a domestic animal it is greatly prized, and its services are extremely valuable; but as a companion of man it does not rank very highly. It displays very little of that affection, nay, absolute devotedness, so characteristic of the dog. It is more attached to locality than to its owner; and there are numerous instances on record of its deserting a family in whose service it has been living for years, on their removal from a residence in which it has been brought up, and to which it will return, even though it be under the rule of strangers. Perhaps one of the most admirable qualities of the cat is its extreme devotion to its young; for their sake it will brave the greatest danger, and its uneasiness at finding them removed, only for a few minutes, is familiar to all. The numerous anecdotes of its maternal care alone would fill a volume. The extraordinary artifices it will resort to to secure its young are astounding, and seem almost human in their character. The period of gestation is sixty-three days, the young remaining blind nine days after birth.

Cat-bird, (*Turdus felivox*,) a species of American thrush, of the same group as the mocking-bird, which it closely resembles in its vocal powers and its courage in defence of its young. It feeds on fruit and berries of all kinds, worms and insects, and builds its nest in the most conspicuous manner, generally in the neighbourhood of human habitations. It derives its name from its peculiar mewing cry when disturbed in its nest.

Catenicella, *kat-een-i-sel'-la*, a genus of Polyzoa, belonging to the order Infundibulata. They are called Chain-zoophytes, having the cells connected by flexible joints, and facing the same way. They come from New Zealand.

Caterpillar, *kăt'-er-pil-lăr*, the common name given to the larvæ of the lepidopterous insects, butterflies and moths. There is as great a variety in the form of caterpillars as in the insects to which they change. Each family, genus, and species may be distinguished by its characteristics. The bodies of caterpillars are generally long, nearly cylindrical, and divided into thirteen segments, of which the anterior forms a horny head, furnished with jaws and antennæ, and usually with groups of simple eyes. On each side of the body are nine spiracles, or small openings, for respiration. The mouth of the caterpillar is usually furnished with strong jaws, capable of tearing, cutting, and masticating the substances on which it feeds, which are very varied in their character, although they entirely differ from the substances eaten by the perfect insect. The first three segments of the body are each furnished with two feet, which represent the six feet of the insect into which they change. All the feet or legs are very short. When the caterpillar has arrived at the proper stage to undergo its metamorphosis, it seeks some secluded spot. Some species find a retreat in the hollows of the barks of trees, others in the walls or wooden palings of the garden, while a few species bury themselves in the earth. Fortunately for the agriculturist, a great quantity of the lepidoptera are destroyed by parasites, which lay their eggs in the larvæ. The caterpillar undergoes two changes, firstly to the pupa state, then to the perfect winged insect. (*See* Butterfly, Moth.)

Catharista, *kăth-a-ris'-ta*, a genus of vulture, living in America. The Black Vulture, sometimes called the Zopilote and the Urubu, belongs to this genus, together with the Turkey buzzard and Californian vulture.

Catodon. (*See* Spermaceti Whale.)

Cat-Sea. (*See* Chimæra.)

Cavy. (*See* Guinea-pig.)

Cawquaw, *kaw'-quaw*, a name for the Canadian Porcupine, *q.v.*

Cebidæ, *see'-bi-de*, (Gr. *kebos*, a family of monkey,) a term applicable to all the monkeys of the American continent. They may be known by their very wide nostrils, separated by a broad septum, and the long tail, mostly prehensile. Their heads are usually very small in proportion to the body.

Cebrio, *seb'-re-o*, a family of coleopterous insects of peculiar structure. The body is of an oblong form, arched above and deflexed in front; the mandibles curved, and entire at the tip. The thorax is broadest behind, and the antennæ generally longer than the head and thorax. Some of these insects are remarkable for having the antennæ beautifully pectinated and of very great length.

Cecidomyia, *se-si-do-mi'-a*, (Gr. *kekidos*, high-leaping; *muia*, a fly,) small two-winged flies, that deposit their eggs on the buds of growing plants. The best known is the wheat-fly, (*Cecidomyia tritici*,) that may be seen in immense masses flying about wheat-fields about June. It deposits its eggs in the centre of the corolla, where the larva is hatched; and, by devouring the pollen, the plant is greatly damaged. When first hatched, they appear in the form of tiny footless maggots, taper towards the head, and blunt at the hinder extremity, with the rings of the body somewhat wrinkled and bulging at the sides. They are at first perfectly transparent and colourless, but soon take a deep yellow or orange colour. The maggots, when fully grown, are nearly an eighth of an inch in length. It is said that they quit the wheat-ears at the beginning of August, and descend into the earth about half an inch below the surface, where they probably remain throughout the winter, making their appearance again in the shape of winged flies when the spring corn begins once more to show its head.

CEDAR-BIRD, *se′-dăr*, (*Ampelis cedrorum*,) a native of America. The appellation of Cedar-bird is given to it on account of its partiality to the berries of the cedar. The passion of the cedar-bird for this diet sometimes leads it into excesses, and, perhaps, premature death. As many as fifteen berries have been found in the throat of a single bird. "The nest is large for the size of the bird, fixed in the forked or horizontal branch of an apple-tree, ten or twelve feet from the ground; outwardly, and at the bottom, is laid a mass of coarse dry stalks of grass, and the inside is lined wholly with very fine stalks of the same material. The eggs are three or four, of a dingy bluish white, thick at the great end, tapering suddenly, and becoming very narrow at the other; marked with small roundish spots of black, of various sizes and shades, and the great end is of a pale, dull, purple tinge, marked likewise with various shades of purple and black."—(Wilson's *American Ornithology*.) The tactics of the parent bird when disturbed in its nest are singular. On such occasions, the female at once flies off to a distance; it neither exhibits the least distress, nor utters a solitary cry of lamentation, and the intruder is left to examine the eggs or young at his leisure. The cedar-bird is largely consumed as an article of food, and at the end of autumn is, owing to its voracity, in prime condition. At this season a great quantity are sent to the markets. The colour of this bird is, on the upper parts, of a fawn-colour; the chin is black, and the abdomen and breast yellow. The wings are slaty-blue; the tail-feathers are rich yellow. Round the forehead there is a dark line, covering the eyes. It is about six inches and a half in length, and is rather a slim-built bird.

CELLEPORA, *sel-lep′-or-ah*, a genus of Polyzoa, with the polyzoray flat and chalky, the cells horizontal and having avicularia.

CELLULARIA, *sel-lew-la′-ri-ah*, a genus of infundibulate Polyzoa, without avicularia, and the cells arranged round an imaginary axis.

CENCHRIS, a genus of viperine snakes, called also the rattlesnakes. A good representation is the Water Viper, sometimes called the Water Moccasin, the Copperhead, or the Cotton-snake. It is black, very venomous, and has its tail terminated by a spine.

CENTETES. (*See* TANREC.)

CENTROPOMUS. (*See* PIKE, AMERICAN.)

CENTROPRISTIS. (*See* BASSE, BLACK.)

CENTIPEDE, *sen′-te-pede*, (Lat. *centum*, a hundred; *pedes*, feet,) (*Scolopendra*,) a genus of carnivorous Annulosa, distinguished by possessing antennæ of fourteen joints or upwards; a mouth composed of two mandibles, a quadrified lip, two palpi or small feet, united at their base, and a second lip formed by a second pair of dilated feet joined at their origin, and terminated by a strong hook, having an opening beneath its point, through which a strong poison is ejected. In the West India Islands and the hotter parts of America the centipede is regarded very seriously as a pest. They attain a length of five or six inches, and very frequently find their way into beds. They will endeavour to escape when a light is brought into the room, but, if molested, will turn and bite, the bite immediately producing inflammation and fever. The common English centipede, however, is a harmless thing, not exceeding an inch in length, and for the most part hiding under the decayed bark of trees and among old lumber.

CENTROPUS, *sen′-trŏ-pus*, a genus of birds inhabiting the warmer parts of the world. The Pheasant Cuckoo of Australia is an example of this genus. All the members of this group have a long spur on their heels, and are called Lark-heeled Cuckoos.

CENTROPYX. (*See* LIZARD, SPURRED.)

CEPHALASPIS, *sef-ă-lăs′-pis*, (Gr. *kephale*, head; *aspis*, shield,) in Geol., the Buckler-head, a fish of the lower Old Red Sandstone or Devonian period, so called from having the bones of the head united into a single shield-like case.

CEPHALOPODA, *sef-ă-lop′-o-dă*, (Gr. *kephale*, head; *pous*, foot,) a sub-class of molluscous animals, more highly organised than any other, presenting undoubted rudiments of an internal skeleton, and containing secretive, digestive, respiratory, and generative organs. They are also distinguished by the possession of locomotive organs around the head in the shape of prolonged tentacula, which project forward and more or less conceal the mouth. The argonauts, cuttles, nautilus, and squids, &c., belong to this sub-class.

CEPHALOPTERUS. (*See* UMBRELLA BIRD.)

CEPHALOPUS, *kef-al′-ŏp-us*, a genus of South African antelopes, including the Rhoode-bok, the Blue-buck, and others.

CEPOLA, *sep-o′-lă*, a genus of fish, the bodies of which are much compressed and elongated. (*See* RIBAND FISH.)

CERAMBYCIDÆ, *se-răm-bi′-se-de*, a family of coleopterous insects distinguished by the inordinate length of their antennæ. Generally they are of elegant form, and are found in forests and woods, on the trunks of trees, but rarely on flowers. Some of the exotic species are remarkable for emitting after death a scent something like attar of roses. The only scented Cerambycid known in England is the musk-beetle, (*Cerambyx moschatus*) It is about an inch long, and of a fine green colour. It is found on willows in the neighbourhood of London. There is a very splendid collection of these insects in the British Museum.

CERASTES, *se-răs′-tees*, (Gr *kerastes*, horn,) a snake distinguished by two horny protuberances on its head, and hence known as the Horned snake. It is said to exist almost entirely without water. It is found in Libya, Arabia, &c.

CERATOPHRYS. (*See* FROG, HORNED.)

CERCOLABES, *ser-col'-ab-ees*, a genus of prehensile-tailed porcupine. (*See* PORCUPINE.)

CERCOLEPTES. (*See* KINKAJOU.)

CERVIDÆ, *ser'-vi-de*, (Lat. *cervus*, a deer,) the Stag or Deer class of animals, a family of quadrupeds belonging to the order Pecora. The characteristic distinctions are solid horns, covered, while young, with a hairy skin, which withers when the horn is fully developed, naked, annual, and branched. There are several species of the Cervidæ. (*See* DEER.)

CERCOPIS. (*See* HOPPERS.)

CEREOPSIS, *ser-e-op'-sis*, the Cape Barron goose, a fine bird found in New Holland. It is remarkable for the large case which covers the greater portion of the beak. It fattens well and is easily bred. It is too quarrelsome to be placed in the same yard with geese.

CERIORNIS. (*See* TROGOPAN.)

CERTHIA. (*See* CREEPER.)

CERURA. (*See* PUSS MOTH.)

CERYLE, *ser'-ri-lee*, a genus of kingfisher inhabiting America and Africa. The Belted Kingfisher is a good example of the genus. They have all comparatively long tails.

CETACEA, *se-tai'-se-ă*, (Gr. *ketos ;* Lat. *cetus*, a whale,) an order of the Mammalia, which differs from the rest of that class both in form and habits. All the Cetacea have a fish-like form ; but the tail-fin is horizontal, and not vertical, as in fishes. It is moved by very powerful muscles, and is the great instrument of progression. There are no posterior limbs, and even the pelvis is only represented by two small rudimentary bones. The anterior limbs are in nearly all cases adapted for swimming. The bones, however, in the skeleton appear like those of a hand, but much abbreviated and solidified. The head is joined to the body without any apparent neck, and the upper parts of the vertebræ are ankylosed or consolidated. The skin is naked, and some of the species are conspicuously whiskered. The Cetacea are viviparous, and suckle their young, towards which they show great affection. They are warm-blooded, and breathe by lungs, and inhale air at the surface of the water. (*See* GREENLAND WHALE, SPERM WHALE, DOLPHIN, PORPOISE.)

CEYX, *see'-ix*, a genus of three-toed kingfisher found in Borneo and the Indian Archipelago.

CHACMA, *tchak'-mah*, the common baboon of Southern Africa.

CHÆROPUS, *cheer'-ŏ-pus*. (*See* BANDICOOT.)

CHÆTODON, *cheet'-ŏd on*, a genus of acanthopterygian fishes found in the tropics. They can shoot drops of water like the Archer fish, *q. v.* They belong to the family Squamipennes.

CHAFFINCH, *tchăf'-finch*, (*Fringilla cœlebs*,) one of the most popular of European song-birds. Not only in England is the chaffinch a favourite, —with the French he is a household proverb ; and as among us light-hearted folks are said to be as " merry as a lark," with them they are said to be " gay as a chaffinch." Nowhere, however, is chaffinch enthusiasm carried to so high a pitch as in Germany. Bechstein informs us that in the knife-making village of Ruhl the inhabitants are such great chaffinch fanciers that they will go sixteen miles to catch a bird, and that on one occasion, when a peculiarly good one was in the market, a crazy fancier, whose means were at low ebb, went and sold his only cow, and bought the coveted chaffinch with the money. The plumage of the chaffinch is as follows :—Fore part of the head black ; back part, and extending even to the nape of the neck, blue, shading off to an olive-tinted chestnut, and again to a gray-green to the stump of the tail. The tail itself is black and gray, and on each of the two outer feathers there is a peculiar wedge-shaped white spot. From the root of the lower half of the beak to the extremity of the under part of the body the colour is reddish-chestnut. The male may be distinguished from the circumstance of being smaller than its mate, whose length is six inches, and from the latter's under-parts being dingier. The chaffinch lays four or five eggs, of pale purplish-buff colour, sparingly streaked and spotted with reddish-brown. Insects are its chief food, and in the summer season it effects incalculable good by destroying myriads of aphides and caterpillars. In Italy the chaffinch is killed for the table. It is very widely spread, being found in parts of Asia, in the north of Africa, and as far west as the Azores. The chaffinch is a very pugnacious bird, and it is of this, its failing, that the English birdcatcher takes advantage in the profitable sport known as "pegging." First of all, the catcher must be provided with a chaffinch that will sing loud and fearlessly in the dark and when its cage is in motion. This is effected by allowing it to remain in its dark moulting-box after the process of moulting is completed; and placing in the same apartment an able singer of its own species. After a while the little prisoner will sing as cheerily as its tutor. Then its cage is taken down, and suspended from the ceiling by an elastic cord. Although the consequent swinging motion seems to bother it vastly for a day or two, it grows used to it in a wonderfully short space of time, and will sing serenely with its house rocking like a ship at sea. Then its cage is tied in a handkerchief, and its trainer walks about the chamber with it swinging in one hand ; and so the teaching progresses, until the poor bird will set up its little pipes at any hour and almost in any position ; then it is called a "pegging-finch," and is worth from one guinea to five. Besides one of these decoys, the chaffinch-pegger must have a stuffed chaffinch mounted on a forked stick, and some pieces of whalebone furnished with a spike in one end, and thickly smeared with birdlime. Thus equipped, the birdcatcher sets out in the early spring morning, carrying his decoy in his cage in a handkerchief. When the country is reached, and the decoy, all in the dark, hears the voices of its free fellows, among the boughs, it breaks out, and returns them note for note as long as they please to keep the game up. By-and-by the birdcatcher marks a tree whence issue chaffinch notes the boldest and most defiant. It is said by these men (and it is their business to know) that never more than a single pair of chaffinches live in a tree. At the foot of the tree containing the bold free bird, the birdcatcher places his decoy, covering it over—cage, handkerchief, and all—with a handful of grass. Then he sticks the little branch on which the stuffed bird is mounted into the trunk of the tree, and just above it, and at a slight angle one or two of the limed whalebone twigs. Then the man retires. Meanwhile the free bird in the tree, with its hen near at hand, has heard the voice of the decoy, and, trembling with jealous rage, has replied to it, and been again replied to, the salvos on either side becoming heavier and fiercer each moment. At last the free bird, finding the mysterious stranger will not respond to the invitation to come out and fight, like a true finch, hops down in search of it. In an instant it spies the stuffed thing sitting out impudently, and, as it were, on the very steps of his castle ; and, with a harsh cry, down he swoops to inflict deadly chastisement ; but, alas ! the treacherous twigs intervene, and, balking it of its vengeance at the very moment of its consummation, hold it an ignominious prisoner till the man runs up and consigns it to the store-cage. A clever birdcatcher will thus capture from twenty to forty singing chaffinches in a single morning.

CHAJA. (*See* SCREAMER, CRESTED.)

CHALCOSOMA. (*See* ATLAS BEETLE.)

CHAMA. (*See* CLAM.)

CHAMECK, *tchah'-mek*, (*Ateles chameck*,) one of the spider monkeys of South America. The thumb has only one joint, and no nail.

CHAMELEON, *kăm-e'-le-on.*—This reptile has probably been the subject of more delusion than any other member of the animal kingdom. The two most flagrant errors concerning the chameleon are, firstly, that the air is its common diet; and, secondly, that it is able to assume any colour, shifting from one to another in the twinkling of an eye. A brief examination of the animal at once contradicts both statements. Indolent and sluggish as it may appear, it has an appetite for something more substantial than air, and enjoys an exercise of its limbs as much as any other reptile. The most curious part of the animal is its tongue ; and it is owing to the singular nature of this organ that the erroneous idea arose of its subsisting on air. This tongue is composed of a hollow tube, which is terminated by a fleshy knob, and has a cup-like cavity in its anterior surface : this is covered with a glutinous secretion. By a wonderful provision the animal can dart its tongue to a considerable distance, and with extraordinary sureness of aim, at its prey. The quickness of this proceeding, together with the length of time the chameleon will exist without food, may, in a great measure, account for the popular delusion. With regard to its colour-changing propensity much might be said and quoted ; only that it is not needful, as this phenomenon has been frequently and satisfactorily explained. The result of Mr Milne Edward's investigation is, in substance, as follows : — Beneath the transparent epidermis of this reptile there is a great quantity of minute soft granules, which bear the different colours : these are more or less extended, according to the quantity of blood that reaches them, and the change of colour is thus effected. The changes it really will undergo under certain powerful excitements are from natural colour, pale gray, through pale green to yellow and dingy red, and sometimes, but rarely, nearly to black. The chameleon is a most sluggish animal, and will sit for hours on the branch of a tree, scarcely giving any token of its existence beyond an occasional roll of its singular eye, which possesses the property of independent motion ; and thus, while one eye is quite motionless, the other will protrude from the animal's head, and glare in a hideous fashion. Then, perhaps, suddenly it will dart out its tongue, oftentimes to twice the length of the whole animal, and whisk some unfortunate insect into its jaws. The period of time a chameleon will exist without food is astonishing. Hasselquist makes mention of one he kept for a month, which during the whole time, as far as he could ascertain, did not eat a single insect. Of this genus there are about eighteen species, all of which are natives of the Old World, principally to be found in Africa and Asia. Some species, however, have been naturalised in Europe.

CHAMOIS, *sham'-moa*, (*Antilope rupicapra.*)—The chamois is rather larger than the roebuck, and, when full grown, weighs from sixty to eighty pounds. Its colour changes with the seasons. In summer it is of a dusky yellowish brown, and in winter jet black, excepting the hair of the forehead, the belly, and the tufts of hair that overhang the hoofs, which is tawny, and remains so always. The black stripe, too, extending from the eyes to the mouth is permanent. It has been a disputed point whether the chamois should be classed with the goat or the antelope genus. Examination, however, shows that there is really but little affinity either in the structure of the animals or their habits. The frontal bone of the chamois just before the horns is concave ; that of the goat is convex. The horns of the latter recede ; those of the former advance, and are perfectly plain and smooth, while the goat's horns are wrinkled. More than all, the chamois is well known to avoid spots favoured by goats ; and no instance has ever been shown where a female of either species has brought forth a cross-bred kid. The head of the chamois exhibits in its construction a wonderful blending of lightness and strength. The frontal bones are so fragile, that a rap of a man's knuckles would suffice to shatter them,—that is, if they were unsupported ; but they are supported, and in a marvellous way. Over the first set of bones a second is thrown, and between the walls are arched cells and substantial girders of solid bone. The arched girders which occupy the space between the upper and lower surface rise, bridge-like, with a spiral twist, and here and there a flying buttress will give additional strength to the walls, or a lateral arch help to support the vault above. The horns of the chamois are very curiously constructed. Up to a certain point the horn is hollow, and thence to the point it is dense and solid. The hollow part fits over a bony protuberance growing out of the skull itself. The horns of a full-grown buck measure about seven inches in length, the points being extremely sharp, and hooked backwards. At first sight it would seem that, as weapons of attack or defence, the chamois' horns, from their formation, would be next to useless. This, however, is far from the state of the case. When fighting, the chamois lowers his horns under the throat of his antagonist, or turns his head sideways, that the sharp point may come against the shoulder of the enemy, and then, drawing them back vigorously, inflicts a most formidable gash. The horns of the male chamois are thicker and altogether stronger-looking than those of the female ; they do not diverge from each other in so straight a line as do hers, but describe a slight curve as they rise upwards and apart from each other. The horns of the doe are not so abruptly hooked as those of her mate. Except when running, the gait of the chamois is extremely awkward. The cause is evident. In the first place, its hoofs, shaped like those of the sheep, but longer and more pointed, are calculated for sliding rather than for stepping, and, in the second, its hinder legs have every appearance of being longer than the fore. A hunter afoot would probably overtake a chamois fleeing over a level plain; but among its native ice-hills the case is very different. Then the true purpose of the awkward looking hind legs appears. Not only do they serve as springs, enabling him to perform miraculous flying leaps from crag to crag, but they break the concussion that would otherwise certainly occur in a leap from a great height, and enable the animal to alight with safety and freedom. A perpendicular wall of rock smooth as glass, and twelve or fifteen feet in height, is no impediment to the upward flight of a chamois. He will leap against the slippery wall, and, striking it with his hind feet, obtain a renewed spring, rebound again in an opposite direction to some higher bank, and there find firm footing on a patch so small that a man's two hands could cover it. The food of the chamois consists of such herbs and lichens as grow on the mountains; when, however, the winter sets in so fiercely that every green thing perishes, the animals shift their quarters from the steeps to the woods that grow at their bases, and there subsist on grass and leaves. An odorous dark-coloured ball is found in the stomach of the chamois, and probably owes its formation to the fibrous and resinous nature of the substances on which it feeds. At the pairing season, a sort of bladder beneath the skin of the buck's horns develops itself. This bladder contains a lymph of a strong musk-like smell, and, if shot at this season, the skin of the head will retain the scent for many years. At this scented period the chamois bucks, incited by jealousy, have most tremendous combats together, and it is at this season that the hunter can easily decoy them to within gunshot by imitating their love-call. The young are born in May, the chamois doe having sometimes two kids at a birth, but frequently but one. The pairing season is November; the period of gestation about twenty weeks. It is only about November that the full-grown patriarchial bucks roam at large,—the remaining portion of the year keeping close in the most secluded and inaccessible places. No animal possesses so tough a skin as the chamois. It will sometimes happen that the hunter's bullet will send one toppling over a precipice nearly a thousand feet deep; but though every bone in its body be smashed by the fall, the hide will remain intact.

Channel Bill, a remarkable bird of Australia, (*Scythrops Novæ Hollandiæ,*) about as long as a crow, but with a very large bill, deeply channelled and serrated, and having a long and broad tail. It feeds on fruits and insects, and utters a loud unpleasant cry.

Chatterer Bohemian, or Bohemian waxwing. (*See* Ampelis.)

Charr, *tsharr,* (*Salmo salvelinus,*) a fish of the Salmon family, inhabiting the lakes of Scotland, Wales, and the north of England. The body is longer and more slender than that of the trout. The back is of an olive colour, speckled with white spots, and the belly red. Its flesh is held in high estimation.

Chati, *tchah'-tee,* a small American leopard, belonging to the group of Tiger-cats.

Chats, a well-known group of small birds, so called on account of their volubility.

Chaus, *tchaws,* (*Chaus sinicus,*) one of the lynxes, inhabiting Asia and Africa. The Caffre Cat belongs to the same genus.

Cheiromys, *ky'-rŏ-mis.* (*See* Aye-Aye.)

Cheironectes. (*See* Yapock.)

Cheiroptera, *ky-rop'-terra.* The group of hand-winged Mammalia popularly called bats, *q. v.*

Chelidon. (*See* Martin.)

Chelidoptera, *ke-lie-dop'-ter-ra,* a genus of barbets, *q. v.*

Chelifer, *keel'-if-er,* a small arachnidan allied to the scorpion, having forceps, but no tail or sting. It is often found among old books, and is quite harmless.

Chelonia, *keel-own'-i-ah.* (*See* Turtle, Green.)

Chelydra. (*See* Terrapin.)

Chelys. (*See* Matamata.)

Chetah, or Hunting Leopard. (*See* Leopard.)

Chiff-Chaff, a pretty British bird (*Sylvia rufa.*) It is very small, and very lively, singing its merry song almost continually. It feeds mostly on insects, and is one of the first Spring visitants. It is green-brown above, and yellowish-white below.

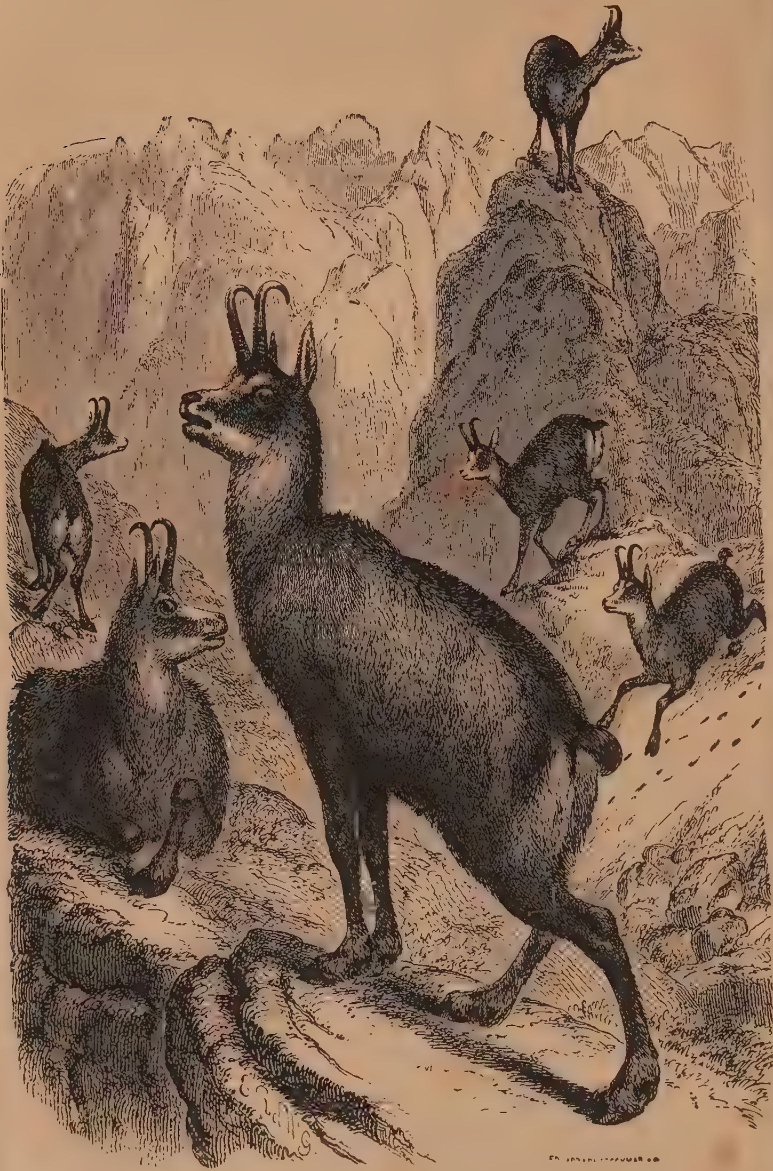
Chigoe, *chee'-go,* a small insect allied to the flea, (*Pulex penetrans,*) inhabiting the West Indies and Central America, and boring its way under the skin. It mostly burrows into the foot, and there lays its eggs, causing mortification if neglected. It is sometimes called the Jigger.

Chikara, a name for the ravine deer of India, or black-tail, (*Tetraceros quadri cornis.*) This is one of the four-horned antelopes.

Chilobothrus, *ky-lo-bŏth'-rus,* a genus of West India snakes, allied to to the anaconda. The yellow-snake of Jamaica belongs to this genus.

Chimæra, *ky-meer'-ah,* a singular genus of pikes, coming between the sturgeon and shark. The northern chimæra is sometimes called the Rabbit-fish, Sea-cat, or King of the Herrings, because it follows the herring shoals, and feeds on the fish.

Chimpanzee, *tshim-păn-zee',* (*Troglodytes niger,*) a species of ape, and one which in form and structure exhibits the greatest resemblance to man. It is a native of the warmest parts of Africa, and seldom attains a height exceeding four feet when in an erect position. Its skin is thickly covered with long black hair in front; and on the head, back, and limbs, the hair grows thicker than elsewhere. The ears are thin, prominent, and naked, and not unlike human ears in shape. The appearance of the nasal organ is that of a mere pucker in the skin. The thumb of the hand is small and weak; that of the foot remarkably large and powerful. One of the most important of the distinctive points of difference between the anatomy of man and the anthropomorphous apes is, that in the former the muscle which terminates in a single tendon, and concentrates its action on the great toe, in the case of the apes the same muscle terminates in three tendons, none of which is connected with the great toe or hinder thumb, but which flex the three middle toes,—part of the adap-



CHAMOIS (Antilope rupicapra).

tation of a foot for clasping as a hand. No ape or monkey is able to stand erect, the knees being always bent, and the body stooping. The great toe of the chimpanzee is shorter than the other toes, and opposed to them as a thumb. The most man-like of this genus, however, is undoubtedly the gorilla, about which, till within the last quarter of a century, scarcely anything beyond the most vague and preposterous stories were known. (*See* Gorilla, Ourang-Outang, Ape.)

Chinchilla, *tshin-tshil'-lă*, (*Chinchilla laniger*,) a small rodent animal, chiefly valuable for its fur, which is beautifully soft, downy, and of considerable length, but so loosely attached to the skin, that it falls off unless handled with considerable care. It associates in numbers, and excavates burrows, in which it resides, feeding chiefly on roots. In size and general form it resembles the rabbit, excepting the tail, which curls over, after the fashion of the squirrel's, and the very long hind legs. The chinchilla belongs to the same family as the jerboa. It is a native of South America, and inhabits the valleys of the high mountain-districts. The length of the body is about nine inches, and that of the tail five. As soon as they die, their hair falls off; and for this reason it is unavailable for many purposes to which otherwise it would be applied.

Chionis. (*See* Sheath-bill.)

Chiton, *ky'-ton*, a genus of molluscs, having the shell in pieces, and jointed like plate armour. There are eight plates.

Chiffra. (*See* Axis.)

Chlamydera. (*See* Bower-Bird.)

Chlamydophorus. (*See* Pichiciago.)

Chlamydosaurus. (*See* Lizard, Frilled.)

Chondroptergyii, *kon-drop-ter-ridge'-i-i*, an order of fishes, in which the skeleton is cartilaginous, and there are no sutures in the skull. The shark, chimæras, sturgeon, and rays belong to this order.

Choiropotamus. (*See* Bosch Vark.)

Cholæpus. (*See* Sloth, Two-toed.)

Chordeiles. (*See* Goatsucker, Virginian.)

Chough, *tshuff*, (Sax. *ceogh*,) (*Coracia gracula*,) a British bird, much resembling in size and habits the jackdaw; its colour, however, is in parts different. It is of a jet black over its upper parts, while the head and neck feathers are tinted with purple. The beak is bright vermilion, bent from the base, and very strong. The legs and feet are of the same colour as the beak, and powerfully formed. Its length, when full grown, is about fifteen inches. Like the jackdaw, the chough is easily tamed, and just as mischievous and entertaining when its domestication has been accomplished.

Chouka. (*See* Chikara.)

Chousingha, *tchoo-sing'-hah*, one of the four-horned antelopes of India. (*See* Chouka.)

Chrysochlore, *kry'-so-clore*, a genus of moles, including the changeable mole of South Africa. The fur of this animal gives out opalescent tints when the direction of the light changes.

Chub, *tshub*, (Ang.-Sax.,) (*Leuciscus cephalus*,) of the same genus with the roach, dace, bleak, &c. It is plentiful in many of the rivers of England and of the south-west of Scotland. The chub rises freely at a variety of baits,—slugs, grasshoppers, cockchafers, and humble bees among the number. The best place to fly-fish for chub is close under over-hanging trees, by the sides of streams, or against piles, or other places that offer ready shelter. The chub spawns in May, and comes into condition again about the end of June or beginning of July. It bites best, and is in the best condition for bottom-fishing, between the middle of October and November. The colours of the chub are blue-black on the upper part, silvery white below; cheeks and gill-covers golden yellow. Weight seldom exceeding five pounds. Is not considered a great dainty.

Chuck Will's Widow, a popular name for the Carolina goatsucker. (*See* Goatsuckers.)

Churchyard Bettle. (*See* Blaps.)

Chyle, *kile*, (Gr. *chulos*, juice,) is the milk-like fluid which is formed by the action of the bile and pancreatic juice upon the chyme in the duodenum, and absorbed by the lacteal vessels. The use of the chyle is to supply the matter from which the blood is formed, and the waste of the living organs repaired. (*See* Digestion.)

Chyme, *kime*, (Gr. *chumos*, juice,) is the ingested mass formed by the action of the stomach upon the food, and which passes from the stomach into the duodenum. (*See* Digestion.)

Cicada, *se-kai'-dă*, (Lat. grasshopper,) a genus of insects of the order Hemiptera, common in tropical and warm temperate regions, and remarkable for the loudness of the sounds they emit. The organs that produce these shrill sounds consist of membranes and fibres connected with powerful muscles, and situated on the under-side of the abdomen. The largest insect of this genus does not exceed an inch in length; yet it is asserted that they may be heard in the still night at a distance of at least half a mile, and that the sound they emit is like grinding a knife on a whetstone.

Cicigua. (*See* Seps.)

Cincindelidæ. (*See* Tiger-Beetles.)

Ciconia. (*See* Stork.)

Cilium, *sil'-i-um*, (Lat.,) is a name given in Anat. to the eyelid or eyelash; and hence the term *ciliary* is applied to the arteries, glands, &c., belonging to the eyelids.

Cimex, *si'-mex*, a genus of heteropterous insects, popularly known as bugs, having no wings, a flat and round abdomen, four joints to the antennæ, and three to the feet.

Cinclosoma, *sin-klo-so'-ma*, a genus of Timalinæ, including the ground-dove or ground-thrush of Australia. This bird prefers the ground to the trees, and feeds mostly on insects. Its flesh is very delicate, and great numbers of these birds are sold in the markets.

Cinnabar Moth, *sin'-nă-bar*, a pretty British moth, coloured red and black, and remarkable for having both surfaces of the wings coloured alike. (*See* Callimorpha.)

Circus. (*See* Harrier-Hen.)

Cirrhipeda, *sir-rip'-ĕd-ah*, a sub-class of crustacea, popularly called Barnacles. When young, they swim about freely, but when old, they are fixed either by their base, or by a foot-stalk, and have their bodies enclosed within shelly valves. The fringed feet are thrust out of the valves, and serve as nets wherein the creature takes its food.

Cirrhoteuthis. (*See* Cuttle.)

Cissa, *sis'-sa*, a beautiful Indian bird, called the Hunting Crow. It has many of the habits of the shrikes, killing birds, and impaling them on thorns. It has a long head, the general colour being grass-green, with a silky lustre, relieved by patches of yellow, spots of white, and stripes of velvet-black.

Cistuda. (*See* Tortoise-Box.)

Civet, *siv'-et*, (*Viverra civetta*,) a native of North Africa. Its size is about two feet six inches in length, and ten or twelve inches in height; head long; muzzle sharp, as in the weasel: a narrow bristly mane runs from the pole of the neck to the tail. Its colour is brownish gray, with black bands and spots. It is a carnivorous animal, and preys on birds, small quadrupeds, and reptiles. The true civet's most remarkable feature consists of a sort of pouch between the anus and sexual organs, in which collects an odorous liquid of considerable value in the perfume market. For the sake of this it is very commonly kept in confinement. The perfume is removed from the pouch about twice a week. The quantity yielded is about a dram at each removal. When this remarkable substance is examined in a fresh state, it is seen to be composed of a vast number of tiny filamentous threads, caused by being pressed through the ducts which lead into the pouch. The pouch is double, and each half is large enough to contain a full-sized almond. Great care has to be observed during the pouch-emptying process; for the civet has a decided objection to it, and will struggle its hardest to avenge itself on the operator. Whether the ferocity of the true civet is caused by the anxiety about the safe-keeping of the secretions, cannot, of course, be explained; but it is certain that those who, on account of the valueless contents of their pouch, are not operated on, are comparatively of amiable disposition, and will even become domesticated.

Clams, *klams*, a group of bivalve shells, found in the hot seas. They have thick shells, with foliated valves, and two hinge teeth in one valve, and one in the other.

Climacteris, *klime-ak'-ter-is*, a genus of Australia creepers, generally found on the bark of the gum-trees, thrusting the beak and tongue into the crevices, and searching for insects.

Climbing Perch, *kli'-ming pertsh* (Ang.-Sax.) (*Anabas scandens.*)—This singular fish is an inhabitant of the ponds and rivers of most parts of the East Indies. Its general form resembles that of the common English perch; but it seldom attains a greater length than six inches. "The most remarkable character presented by these fishes consists in the structure of the superior pharyngeal bones, which are dilated into voluminous folded laminæ, enclosed in a large cavity at the base of the skull, and forming numerous cells, in which a supply of water may be carried for the purpose of moistening the gills when the creature, as its habit is, quits the water for a time."—(Dallas.) It has been asserted, and that by travellers and explorers whose veracity is beyond question, that this singular fish has been seen *to climb trees*, fixing its anal fin in cavities of the bark, and urging its way upwards by distending and contracting its body. "Though these fish are sometimes compelled in their distress to travel by day, and have been met in the glare of noon toiling along a dusty road, their migrations are generally performed at night, or in early morning, whilst the grass is yet wet with dew. Climbing perches are plentiful in the Ganges, and the boatmen have been known to keep them for five or six days in an earthen pot without water, using daily what they wanted, and finding them as lively as when caught."—(Chambers's *Encyclopædia.*)

Clio, *kli'-o*, a genus of shell-less molluscs, so extremely abundant in the Arctic seas, that they constitute a chief part of the food of whales. *Whales' food* is the name by which they are known to the fishermen. Sometimes the water is so full of them, that it would be impossible for a creature of so ponderous a maw as the whale to open his jaws without engulfing thousands. They belong to the Pteropoda, *q. v.*

Clothes-Moth, ***kloathz'-moth***, (Ang.-Sax.,) a name common to a number of small moths of the genus Tinea, whose larvæ are extremely destructive to woollen fabrics, &c. They begin not only to eat as soon as they are hatched, but to hack to bits the substance in which they are hidden, and uniting the fragments with a glutinous silk of their own producing, make, of the whole, cases to live in. Cleanliness and exposure to light are the best safeguard against these tiresome insects.

Clotho, *klow'-tho*. (*See* Puff Adder.) This name is also given to a genus of spiders, belonging to the family Drassidæ.

Clupeidæ, *klu-pe'-e-de*, (Lat. *clupea*, a shad,) a family of fishes allied to the Salmonidæ, but differing from them because wanting an adipose fin. The herring may be regarded as the type of this order. They generally congregate in shoals, and periodically visit certain coasts. They are very widely diffused all over the world.

Clytus, *kli'-tus*, a genus of coleopterous insects, abounding in species. A few are found in this country; but North America is their chief abiding-place. There one of the largest of the genus, (*Clytus speciosus*,) is a great destroyer of the sugar-maple. It is about an inch long, and its colour black, banded and spotted with yellow. Many sorts of clytus are found on flowers, to which they resort for the sake of the pollen.

Coal-fish, (*Cadus carbonarius*,) a somewhat common fish, extensively distributed through the principal seas of Europe, being abundant in the Baltic, the Mediterranean, and the Northern Seas; also found in large quantities on the coast of Great Britain. According to Mr Couch: "It is in the highest condition from October to December, at which season it prowls after prey in large companies; so that, when met with, they prove a valuable capture to the fisherman; for, though but coarse food, yet, being wholesome, substantial, and cheap, they are eagerly purchased by the poor, either fresh or salted. . . . I have known four men in two boats, two men in each boat, take over two tons' weight of this fish in a very few hours. The season for spawning is early in spring; immediately after which the coal-fish becomes so lank as to be entirely worthless, in which state it continues through the summer." It owes its singular appellation to the curious nature of its skin, which, upon being handled, soils the fingers in the same way as would result from touching coal. It is likewise known, during its progress from birth to maturity, by the names of *cuddy*, *sythe*, and *sillock*. The fishermen of Yorkshire, however, have given it two more aliases: when young, they call it ***parr;*** and the old fish are named *lillets*.

Coaita, *quah'-tah*, (*Ateles Paniscus.*) The commonest spider-monkey of South America. It is very gentle, and easily tamed.

Coaiti, *quah'-tee.* (*See* Nasua.)

Cobbler-fish. (*See* Caranx.)

Cobra di Capello. (*See* Hooded Snake.)

Coccinella. (*See* Lady-bird.)

Coccothraustes. (*See* Grosbeak.)

Coccus. (*See* Cochineal.)

Coccyginæ. The lark-heeled cuckoos. (*See* Centropus.)

Coccygus. (*See* Cow-bird.)

Cochineal, *kotsch'-in-eel*, (Sp. *cochinilla.*)—This beautiful dye is obtained from the *Coccus cacti*, a small insect infesting a tribe of cacti growing in Honduras and other parts of South America, (*see* also Carmine.) The female insects, which are wingless, are alone collected, and the different degrees of value attached to them depend on the methods employed to kill and dry the insects. Analyses of cochineal have yielded chitine, fatty matter, phosphates of lime and potash, and the colouring matter carmine. Cochineal, in conjunction with chloride of tin, forms the "tin spirits" of the dyer. The cochineal insect is also cultivated in Mexico, Teneriffe, Java, and the West Indies. Efforts have been made, with more or less success, to introduce it into Van Diemen's Land, the Cape of Good Hope, Algeria, and Spain.

Cock, Domestic, *kok*, (Sax. *coc*, Fr. *coq.*,) (*Gallus domesticus.*)—At what period of the world's history this valuable bird was brought under the control of man, it is almost impossible to determine. Without doubt, they were well known over many parts of Europe and Asia many hundred years before the Christian era. Pliny, in speaking of it, says:—"After the peacock, the birds which are most sensible to glory are those active sentinels which nature has produced to rouse us from our matin slumbers and send us to our daily occupations. They are acquainted with the stars, and every three hours they indicate by their crowing the different periods of the day. The gait of the cock is proud and commanding; he walks with head erect and elevated crest. Alone of all birds he habitually looks up to the sky, raising at the same time his curved and scythe-formed tail, and inspiring terror in the lion himself, the most intrepid of beasts." A mode of divination was practised by the ancient Greeks with these birds. The letters of the alphabet were written in a circle, and a grain of wheat and barley laid on each letter. Then a cock, consecrated for the occasion, was led within the circle. The required information was obtained by putting together those letters off which the cock picked the grains. This mode, however, was abandoned on the discovery that it was not an uncommon thing for the priests to have, as well as the genuine grains, imitations in wax; so that by proper management the bird could be made to uncover these letters that best accorded with their views. It has been asserted that our original breeds of domestic poultry were derived from Persia. This, however, takes root in the fact of Aristophanes alluding to the cock as the "Persian" bird. This is, in all probability, but a hinting at the fact that during the intercourse of the Greeks with the Persians, they obtained from them a breed of fowls partly or thoroughly domesticated. Although poultry has been known to exist in Persia from a very remote antiquity, the most patient research has failed to discover any birds of the genus Gallus in that country. According to Temminck, our domestic cock is derived from the Jago cocks, (*Gallus giganteus*,) a large and wild species inhabiting the island of Sumatra, and from the species Bankiva, another primitive bird found in the Javan forests. Nor is this argument without substantial basis; for the size of our common cock is intermediate between the Jago and the Bankiva, and in the nature of the feathers and the distribution of the barbs the resemblance is perfect; moreover, in the two wild species mentioned, the females are provided with a crest and small barbles,—characters which are not found in any other known primitive races. The domestic cock has his head surmounted by a notched crimson fleshy substance, called a comb; and under the throat hang two other pendulous fleshy bodies, called wattles. In both sexes there is below the ear an oblong spot, the interior of which is reddish and the remainder white. The feathers arise in pairs from each sheath, touching by their points within the skin, but diverging in their course outwards. On the neck the feathers are long and narrow; on the rump they are of the same form, but droop laterally over the extremity of the wings, which are quite short, and terminate at the origin of the tail, the plumes of which are vertical. In the centre of the cock's tail are two long feathers, which fall back in a graceful arch. When the cock reaches the age of six months, he attains maturity, and his powers remain undiminished till he is three years old. Then, if younger male birds be about, he will find himself slighted by his numerous wives, and be compelled to yield to a rival the empire of the yard. Cock-fighting is one of the most widely-spread sports in the world. Captain Cook found it commonly practised among the South-Sea Islanders, and Mr Ellis describes it as one of the most ancient games among the Tahitians. Long before a ship touched the shores of Polynesia, cock-fighting was known to the inhabitants. Amongst them, however, the rules that distinguish the "civilised" cockpit are not practised. It is, or, happily, *was*, our custom to clip the combatants of every superfluous feather; the Polynesians, on the contrary, delight to pit them with the full complement of plumage adorning them. In another respect, too, these savage cock-fighters showed themselves more humane than us; they never armed the heels of their birds with spurs; and as soon as one bird was observed to avoid his antagonist, he was said to be *vi*, (beaten,) and at once taken away. The common jungle-fowl of continental India (*Gallus Sonneratii*) is a very favourite fighting-bird with the Mussulman natives of India. Considering their insignificant means of defence, the courage exhibited by the domestic cock is very singular. Bishop Stanley, in his *British Birds*, says, "We knew an instance where a barn-door cock became the terror of his little domain. Accustomed to be fed by his owner, a clergyman, he shortly began to express his disappointment by very determined attacks, if his master happened to pass him without the accustomed offering. On one occasion he actually struck a piece out of a strong kerseymere gaiter, and repeated the attacks in spite of some severe kicks it was found necessary to inflict in selfdefence. Nothing daunted, though occasionally kicked several yards like a football, he would still come on as fiercely as ever for three or four times. His reasoning, too, appeared to be on a par with his courage, for he soon discovered that women were protected by the lower part of their dress, and, accordingly, instead of flying at their legs and feet, he invariably flew at their heads, fixing himself on their shoulders."

Cock of the Plains, (*Tetrao urophasianus,*) an American bird closely allied to the grouse and capercaillie, with many of the same habits.

Cock of the Rock, one of the Manakins, (*Rupicola aurantia.*)—This lovely bird inhabits South America, and haunts deep and rocky places. The colour of the plumage is rich orange, except the quill feathers of the wings, which are black. A flat, helmet-like crest extends from the base of the beak to the top of the head, and inclines forward beyond the point of the bill.

Cock of the Wood. (*See* Capercailie.)

Cockatoos, *kok-a-tooz'.*—These birds are confined to the Eastern Archipelago and Australia; in the latter country they are very abundant. Like others of their congeners, they make their nests in decayed trees; indeed, if the tree should not be very much decayed, it makes little difference to the cockatoo, who can speedily dig for himself a hole in the trunk with his iron-like bill. They are easily tamed, and learn to imitate the human voice in some respects, although with little accuracy. A capital account of cockatoo-hunting by the natives is related by Captain Grey:—"Perhaps as fine a sight as can be seen in the whole circle of native sports is the killing of cockatoos with the kiley, or boomerang. A native perceives a large flight of cockatoos in a forest which encircles a lagoon; and in the leafy summits of the trees sit a countless number of cockatoos, screaming and flying from tree to tree as they make their arrangements for a night's sound sleep. The native throws aside his cloak, so that he may not have even this slight covering to impede his motions, draws his kiley from his belt, and, with a noiseless elastic step, approaches the lagoon, creeping from tree to tree, from bush to bush, and disturbing the birds as little as possible. Their sentinels, however, take the alarm; the cockatoos farthest from the water fly to the tree near its edge, and thus they keep concentrating their forces as the native advances. They are aware that danger is at hand, but are ignorant of its nature. At length, the pursuer almost reaches the edge of the water, and the scared cockatoos, with wild cries, spring into the air. At the same instant, the native raises his right hand high over his shoulder, and bounding forward with his utmost speed for a few paces, to give impetus to his blow, the kiley quits his hand as if it would strike the water; but when it has almost touched the unruffled surface of the lake, it spins upwards with inconceivable velocity and with the strangest contortions. In vain the terrified cockatoos try to avoid it: it sweeps wildly and uncertainly through the air; and so eccentric are its motions, that it requires but a slight stretch of the imagination to fancy it endowed with life, and, with fell swoop, is in rapid pursuit of the devoted birds, some of which are almost certain to be brought screaming to the earth. But the wily savage has not yet done with them. He avails himself of the extraordinary attachment which these birds have for one another, and fastening a wounded one to a tree, so that its cries may induce its companions to return, he watches his opportunity, by throwing his kiley or spear, to add another bird or two to the booty he has already obtained." Of this bird there are several species; as follows:—*Broad,* or *Rose-crested Cockatoo,* (*Cacatua cristata.*)—This is the largest of the cockatoos, being about two feet in length. It is distinguished from the other species, which not only by its size, but also by its crest, is arched over the head, and of a bright orange-red colour beneath. The general colour of this bird is white, with a pink tinge. It is sometimes domesticated, and learns to mimic the voices of various animals with which it is domiciled or in the vicinity of which it is placed, It will mew like a cat, bark like a dog, or imitate, with marvellous correctness, the crowing of a cock. *Great Sulphur-crested Cockatoo,* (*Cacatua galerita.*)—This species is at the same time the handsomest and most common of the family. Its plumage is white, tinged with yellow on the tail and orange or lemon-colour on its crest, which is pointed, and about seven or eight inches in length. In Australia, these birds abound in large flocks of thousands in number. They commit frightful havoc in the corn-fields, and the sight of this handsome bird is sufficient to create the utmost dismay in the mind of the agriculturist, who knows too well the affinity betwixt ripe corn and the lemon-crested cockatoo. *Lesser Sulphur-crested Cockatoo,* (*Cacatua sulphurea.*)—Greatly resembling the preceding, only some few inches smaller. It is a native of the Moluccas; but of its habits little or nothing is known. It is very pretty, affectionate, and good-tempered, a rare combination of excellent qualities. There is another species of the cockatoo genus, discovered within the last thirty years. A specimen was sent to Mr Leadbetter, after whom it is named, (*Cacatua Leadbeateri.*)—It is about fifteen inches in length, of a white colour, tinged with pink; and the crest is beautifully bound with two bands of crimson and one of yellow. This species is exceedingly rare and greatly prized. The Philip Island cockatoo, or Parrot, as it is wrongly named, (*Nestor productus,*) is now extinct. It is remarkable for the extreme length of the upper nostril, which looks more like pickaxe than a beak. The Bankivan cockatoo, (*Calyptorhynchus Bankiva,*) inhabits New South Wales, and is found in the Bush. It feeds partly on seeds of the Bankiva, and partly on grass, which it digs out of the rotten wood.

Cockchafer, *kok'-chai-fer,* (Ang.-Sax.,) (*Melolontha vulgaris,*) a well-known species of beetle, belonging to the Lamellicorns. It is very common throughout the greater part of Europe, and in this country is particularly abundant. In its larva state it lives for nearly four years, and feeds, very voraciously, on corn, &c. The perfect insect has an exceedingly short existence, sometimes living only a week, and occasionally so long as a month, after arriving at maturity. At this stage it feeds on the leaves of various trees. The sycamore, the lime, the beech, and willow are most in requisition: these trees are sometimes completely loaded with cockchafers. In its depredations it more nearly resembles the locust than any other insect; and, at certain times, commits frightful ravages in agricultural districts. A remarkable instance of this occurred in Ireland about the year 1688. On this occasion, it is said, they hung in clusters on the trees and hedges, like bees swarming: the noise of their countless jaws at work was heard by every traveller, and was compared to that of the sawing of timber.

Cockle, *kok'-l*, (*Cardium*,) a genus of mollusca belonging to the Cardiaceæ. There are numerous species of this animal, some two hundred of which are known. The common cockle is the most abundant, and large quantities of this shell-fish are found on the coasts of Great Britain, principally on muddy and sandy banks. By some it is considered a highly nutritious article of food; and, indeed, the enormous demand for it would seem to justify such an opinion. The structure of the cockle is somewhat curious; it has two adductor muscles, which serve the animal to draw the valves of the shell together. Its foot is very large, compared with the size of the animal, and bent in the middle. This member is not only used for the purpose of progression, but also for excavating holes in the mud and sand in which it lives. By suddenly straightening the foot, the cockle moves with a jump As the foot is smaller than the shell, it may appear a little singular how it is enabled to bore a hole sufficiently large to admit the whole animal. This is accomplished by distending the foot with water, and then, by a rotary motion, the seemingly impossible feat is easily achieved.

Cockroach. (*See* Black Beetle.)

Cocoon, *kok-oon'*, (Fr. *cocon*,) the silky tissue or envelope which the larvæ of many insects spin, as a covering for themselves immediately before passing into the pupa form. The name is also given to coverings made of other materials. Some caterpillars work into the silky envelope the hairs which cover their bodies; others imbed in the network a leaf, or several leaves fastened together. The larvæ of some insects produce the silken substance of which the cocoons are formed in much greater quantity than others. One of the most useful producers is the ordinary silkworm, whose cocoon is a close and compact oval ball, surrounded with a gauze-like glossy covering. It consists of one long continuous thread, sometimes a thousand feet long. Some parts of the thread are weaker than others; but the greater portion can be unwound as easily as a ball of cotton thread. Different insects vary in the time occupied in spinning their cocoons: several days are spent by the silkworm in this task. In covering the pupa, many insects proceed with an almost mathematical nicety with regard to the direction and disposition of their threads.

Cod, *kod*, (Ang.-Sax.)—This fish is, perhaps, the most important to the human family of all the inhabitants of the deep. It affords labour and food to thousands of men, and is one of the most splendid national resources,—one which, owing to the wonderful provision of nature with regard to the fecundity of this fish, is not likely to diminish for a considerable period. For more than four centuries has the cod-fishery been carried on, without any interruption; yet the supply at the present day is something enormous. A single fisherman has been known to capture 500 of this fish in a day of ten hours. Now, as the cod frequently attains a weight of 40 lbs., this haul of the fisherman, even setting it down at a moderate rate, must have amounted to something like 20,000 lbs. of fish; and multiply this by several thousands, and we get the amount of cod which is daily obtained during the season. The great supply of cod is from the banks of Newfoundland; but the cod-fisheries near the coasts of Scotland, Sweden, and Iceland, are by no means insignificant. The principal places in which it is found on our coasts are thus alluded to by Mr Yarrell:—"A change has taken place, from the cod having shifted their ground. Formerly the Gravesend and Barking fishermen obtained few cod nearer than the Orkneys or the Dogger Bank; but, for the last two or three years, the supply for the London market has been obtained by going no farther than the Lincolnshire and Norfolk coasts, and even between that and London, where previously very few fish could be obtained." There are about 6000 vessels employed in the cod-fishery, in addition to a large quantity of small boats. All the cod are caught by hooks and lines; the bait used commonly consists of limpets, whelks, and pieces of various fishes. Our wonder at the extraordinary supply of this fish is considerably diminished when we examine the roe of the cod. By those who have taken the trouble to satisfy themselves, it has been calculated that when one devours a cod's roe, he also devours no less than about 180,000,000 lbs. of food, supposing it were allowed to arrive at maturity. One's brain reels at the bare idea of reckoning what *might* be the condition of cod-dom if these fishes were left alone for a few years. The cod is a very voracious fish, a good instance of which is related by Yarrel. "Mr Crouch," says he, "has taken thirty-five crabs, none less than the size of a half-crown piece, from the stomach of a cod." It is not particular in its diet, but devours indiscriminately all the small fish it can catch. The *modus operandi* of the fishermen is thus described:—"For the deep-sea fishing very long lines are used;—these are fixed to the bottom by means of a small anchor, the other end being supported by a buoy, and the hooks are placed at the extremities of short lines, usually about six feet in length, attached at intervals to the main line. The long lines are usually left for about six hours, or for a whole tide, when they are taken up and examined. In the interval the fishermen are not idle; they carry on the work of destruction by means of hand-lines, of which each man manages a pair."—(Dallas's *Animal Kingdom*.)

Cœlenterata, *se-len-ter-ai'-ta*, (Gr. *koilos*, hollow; *teras*, an anomaly,) in Zool., one of the two sub-kingdoms into which the *Radiata* of Cuvier have recently been divided. It corresponds to the class *Polypi* of former writers, and includes most of those curious stationary creatures which are introduced into marine aquaria; as the sea-anemones and corals and madrepores. (*See* Animal Kingdom.)

Cœlogenys. (*See* Paca.)

Coendoo. (*See* Porcupine, Brazilian.)

Colaptes. (*See* Woodpeckers.)

Coleoptera, *kol-e-op'-ter-ă*, (Gr. *koleos*, a sheath; *pteron*, a wing,) the name applied to an order of insects possessed of four wings, the external pair not being formed for flight, but as sheaths for the interior pair. The Coleoptera comprehend all the Beetle tribe. The larvæ of coleopterous insects undergo a complete transformation; those which burrow in the ground generally prepare for the pupa state by removing the earth that surrounds them, so as to form an open oval space; others form a kind of cocoon or web round them; and some assume the perfect state without any sort of preparation. Although some of these insects may be injurious to vegetation, taken as a whole, there can be no doubt that their existence is conducive to man's comfort, and in some cases to a much greater extent than he suspects. Thus, the tiger-beetles, (*Cicindelidæ,*) the predacious ground-bettles, (*Carabidæ,*) the diving-beetles, (*Dyticidæ,*) the lady-birds, (*Coccinellidæ,*) and many others, do mankind great service by preying upon caterpillars, plant-lice, &c., while the many dung-beetles, (*Coprididæ, Histeridæ, Geotrupidæ,* &c.,) do good work as removers of carrion and as scavengers generally. Others there are which subsist on the various poisonous fungi; and others, again, which attack dead but still standing trees, and in a very short time cause them to cease to cumber the ground.

Colon, *ko'-lon,* (Gr. *kolon,* a member or limb,) in Anat., is the largest of the intestines, or, rather, the largest division of the intestinal canal. This canal is divided into the small and great intestines, the former consisting of the duodenum, jejunum, and ileum; the latter of the cæcum, colon, and rectum. The great intestine commences in the right iliac fossa, in a dilatation of considerable size, called the cæcum. It ascends through the right lumbar and hypochondriac regions to the under surface of the liver; passes transversely across the abdomen, on the confines of the epigastric and umbilical regions, to the left hypochondriac region; descends through the left lumbar region to the left iliac fossa, where it becomes convoluted, and forms the sigmoid flexure, from which the rectum extends to the anus. The colon is thus divided into four parts,—the ascending, transverse, descending, and the sigmoid flexure. The colon in man averages from four to five feet in length, and about two inches in diameter, being about a fourth part as long, and twice as wide, as the small intestine. The canal is not smooth and uniform, as in the small intestines, but bulges out between the bands of muscular fibre into various prominences, more or less regular in their form, in which the fæces lodge for a time, and become deprived of much of their moisture as they are rolled onwards by the peristaltic action to the rectum and anus. The colon is enveloped in the serous membrane called the peritoneum, which forms the external covering of all the abdominal viscera. (*See* Intestines.)

Colius. (*See* Coly.)

Collocalia. (*See* Birds' Nests, Edible.)

Colobus, *kol'-ŏ-bus,* a genus of African monkeys, in which the thumb of the forepaws is nearly obsolete. It includes several species, among which are the satanus, and the beautiful guereza, with its white-fringed sides.

Colocolo, *kol-ŏ-koal'-o,* a beautiful little leopard of Guiana, notable for the short longitudinal streaks on its fur.

Colubrinæ, *kol-ew-bry'-nee,* a sub-order of snakes, having the abdomen covered with broad band-like plates, the tail conical and tapering, and teeth in both jaws.

Columbidæ, *kol-um'-bi-de,* (Lat. *columba,* a dove,) a family of birds comprising the pigeons, doves, and turtle-doves. The Columbidæ are chiefly remarkable for the way in which they feed their young. The bird's crop is furnished with numerous glands, which, in both sexes, become developed during incubation. These glands secrete a sort of milky substance, with which the food that passes into the crop is moistened. Saturated with this fluid, the food is regurgitated by the old birds for the nourishment of the young. (*See* Pigeon.)

Coly, *ko'-li,* a name for a group of birds inhabiting Africa and India, and sometimes called Mouse-birds, from the softness of their plumage. They are called the Plantain-eaters, or Touracos, *q. v.*

Colymbus. (*See* Divers.)

Comatula, *com-aï'-tū-la,* a genus of starfishes of the order Crinoidea, popularly called Feather-stars; when young they are fastened to a footstalk, and when adult they swim about freely.

Conch, *konk,* a univalve shell, (*Triton varigatus,*) allied to the whelks, and largely used as a trumpet. For this purpose a round hole, about as large as a sixpence, is bored into the shell on one side, and near the tip, and the conch is sounded by blowing across the hole. It is used in the South Sea Islands, and also in some parts of South America. Nearly one hundred species of Triton are known. This shell is sometimes called the Sea-trumpet.

Conchifera, *kon-kif'-e-ra,* (Lat. *concha,* a shell; *fero,* I bear,) the scientific name given to certain bivalve shells, whose inhabitants are susceptible of no other impressions save those of immediate contact. The three orders into which this family is divided are the Brachiopoda, Dimyaria, and Monomyaria.

Conchology. (*See* Mollusca.)

Condor, *kon'-dor,* (*Sarcoramphus gryphus,*) a large bird of the Vulture species. It is almost strictly confined to the immense chain of the Andes, as is called the vast mountain range that runs along the whole west coast of South America. Humboldt, who, with his companion Bonpland, passed a considerable period in these regions, and lost no opportunity of observing the condor, and making the strictest inquiries concerning its habits, was enabled to clear away much of the mystery that had hitherto attached to the bird. Previously it was regarded as a bird of such monstrous proportions, that in its flight it cast a shadow on the earth like a big cloud, and so ferocious as to snatch up and bear off infants, kids, and lambs in an instant. Humboldt, however, found the little children of the Indians sleeping in the open air, while their parents were away gathering snow to sell in the neighbouring towns; and at least half a dozen condors were in sight, hovering aloft and perched on the neighbouring heights. To all his inquiries on the subject, he was answered that a single case of child-stealing by these big birds was unknown. Yet that this arises from no lack of courage on the part of the condor is certain, for, as Humboldt was informed, two of them will even attack a heifer, pursuing it for miles, and wounding it with their beaks and talons. Gradually the poor animal will relax its speed, and from sheer exhaustion and thirst loll its tongue. Now is the condor's time. In an instant it darts at the tongue, and maintains so cruel a grip, that by and by the heifer sinks to the ground at the mercy of its enemies. The above-named renowned traveller also mentions an astonishing instance of vitality displayed by a condor which some Indians at Riobomba had taken alive. They first strangled it with a lasso and hanged it to a tree, pulling it forcibly by the feet for several minutes; yet scarcely was the lasso removed when the bird arose and walked about as though nothing was the matter. Three balls were then discharged from a pistol at less than four paces, all of which entered its body, and wounded it in the neck, chest, and abdomen. It still, however, kept its legs. Another ball then struck its thigh; but, though it fell to the ground, it did not die of its wounds for half an hour afterwards. The condor builds no nest, but lays its eggs, which are three or four inches in length, and perfectly white, on the bare rocks. Broderip relates that he saw an egg laid by one of the pair confined in the Zoological Gardens. It was on the bare naked floor of the prison. There was no appearance of a nest of any kind. The hen condor does not appear to have exhibited any inclination to sit on her egg, so the next one that was laid was put under a Dorking fowl. The result was successful; but the issue, a male condor, only lived three weeks.

Condylura, *kon-di-lu'-ra*, (*Condylura cristata*,) a small insectivorous animal of mole-like appearance, found in North America. It is about four inches and a half long from nose to rump, and has a bushy tail more than three inches long. Its head is remarkably large, body thick and short, and nose rather thick, and projecting beyond the mouth. At the end of the nose is a flat star-like process composed of seventeen cartilaginous points. These rays are movable, and can be opened or closed at pleasure, and as they are of a bright rose colour, the effect is most singular. These animals do not make such hills as the European moles, but only little subterraneous walks in the fields, forming banks about four inches broad by two inches thick, and which give way when trod on. The generic name (*Astromyctes*) is sometimes given to this animal.

Conger Eel, *kong'-gur*, (*Conger vulgaris.*) —This fish may easily be distinguished from the fresh-water species by the upper jaw being the longest, and the dorsal fin commencing much nearer the head. On account of this difference, Cuvier separated the congers from the rest as a sub-genus. It is darker on the upper parts than the common eel, and brighter beneath. It attains a very large size, weighing occasionally from seventy to a hundred pounds, and measuring six and eight feet in length. The principal conger fishery is on the Cornish coast. The fishing takes place at night, (the darker the more chance of success,) and the ordinary bait is a pilchard. "It is dreadfully voracious," says Mr Couch; "it spares not even its own species. From the stomach of a specimen weighing twenty-five pounds I took three common dabs, and a young conger of three feet in length. The power of jaw in this fish is very great; in the stomach of small specimens examined on the coast I have found the young testaceous coverings of our shell-fish comminuted into fragments. They are often tempted by the crustacea entrapped in the lobster-pots to enter these decoys in order to feed on them, and are thus frequently captured."

Conirostres, *ko-ni-ros'-trees*, a tribe of birds, including the crows, magpies, Paradise birds, starlings, and many others.

Connochetes. (*See* Gnu.)

Conurus. (*See* Parrots.)

Coot, *koot*.—The habits of this bird closely resemble those of the common Gallinæ. They are found in various parts of Europe, Asia, and America, but abound in larger numbers in Holland than elsewhere. It is about sixteen inches in length; its upper parts are slaty black, and its under lead-colour. From the bill almost to the crown of the head there is a white excrescence, destitute of feathers, and smooth and round. On this account it is sometimes called the bald-headed coot. The nest of this bird, commonly built in a bush of rushes, and surrounded by water, is, although of ragged appearance, exceedingly strong. "So firm are some of them," writes a sporting naturalist, "that whilst up to my knees in water, they afforded me a seat sufficiently strong to support my weight." The common coot is found in many parts of England, particularly in the Southampton Water and in the Isle of Sheppey.

Copepoda, *koh-pep'-ŏd-ah*, an order of Entromostraca, known by the fringed five pairs of feet, which are mostly used for swimming. The Cyclops and its kin belong to this family.

Copperhead. (*See* Cenchris.)

Copridæ, *kop'-ri-de*, a family of four-winged insects allied to the Scarabææ. The name is from the Greek word for dung, (*kopros*,) in which these beetles are generally found.

Coracia. (*See* Chough.)

Coracias. (*See* Roller.)

Coral Reef, *kor'-ăl*, (Gr. *korallion*, Fr. *corail*, Ger. *riff*, a reef,) a term applied by naturalists as well as by mariners, to any connected mass of coral structures, whether trending away in long partially submerged ledges, encircling islands like breakwater-barriers, or rising as low ring-shaped islets above the waters of the ocean. In almost all tropical seas, incrusting patches or small banks of living coral are to be found along the shores, wherever they consist of hard rock and the water is quite clear. In the Indian and Pacific oceans, however, far away from any land, huge masses of coral rock rise up from vast and unknown depths just to the level of low water. These masses are often unbroken for many miles in length and breadth, and groups of such masses, separated by small intervals, occur over spaces sometimes of 400 or 500 miles long by 50 or 60 in width. One of the greatest formations of coral rock is along the north-east coast of Australia. The reef masses consist of living corals only at their upper and outer surface; all the interior and the lower parts are composed of dead corals and shells, either whole or in fragments, and the calcareous portions of other marine animals. The interstices of the mass are filled by calcareous sand and mud derived from the waste and *débris*, the wear and tear of the corals and shells, and by countless myriads of minute organisms, mostly calcareous also. The surface of a reef when exposed at low water, is composed of solid-looking stone, which is often capable of being split up and lifted in slabs, bearing no small resemblance to some of our oldest limestones. The slabs, when broken open, are frequently found to have a semi-crystalline structure internally, by which the forms and the organic structure of the corals and shells are more or less disguised and obliterated. The raised coral-reefs in the islands of Timor and Java are often internally as white and friable as chalk. Darwin states that the principal reef-builders are the madrepores, astræas, porites, meandrinæ, and nullipores, at moderate depths, and the millepores, seriatopores, and other delicate forms, at depths from fifteen to twenty fathoms,—the great field of coral development thus lying between low water and twenty fathoms.—*Ref.* Darwin *On the Structure and Distribution of Coral Reefs ; Voyage of H.M.S. Fly;* Dana's *Report on the Geology of the United States Exploring Expedition.*

Cordonnier. (*See* Caranx.)

Cordyle, *kor'-dile,* a name given to several lizards belonging to the family Zonuridæ, *q. v.* The rough-tailed cordyle is common in South Africa, and is so fierce-looking with its curiously whorled tail, that most persons are much afraid of it.

Coreidæ, *ko-re'-ĭd-ee,* a family of heteropterous insects, having the beak and antennæ four-jointed. They often exhale an unpleasant odour.

Cormorant, *kor'-mor-ănt,* (Fr. *cormoran.*) —This bird is very widely diffused, and inhabits the New as well as the Old continent. Its length is from twenty-seven to twenty-nine inches. Under the throat there is a whitish collar, reaching as far upward as the eyes. Top of the head, neck, breast, and lower parts greenish black ; upper part ashy brown, bordered by a band of glossy greenish black ; quill and tail feathers black ; bill blackish ash ; feet black. This is the bird's winter plumage. In the spring the occiput and a part of the nape of the neck are adorned by a crest of long green feathers, and the collar round the neck changes to the purest white. "The young, when first hatched," writes Mr Selby, "are quite naked, and very ugly, the skin being of a purplish black. This, in six or seven days, becomes clothed with a thin black down ; but the feathered plumage is not perfected in less than five or six weeks. I have repeatedly found that, when thrown into the sea, though only half-fledged, they immediately plunge beneath the surface, and endeavour to escape by diving. This they will do to a great distance, using their imperfect wings and pursuing their submarine flight in the same manner, and almost with as much effect, as their parents." The smell arising from the cormorant is said to be so offensive that the Greenlanders will not touch it. If buried in the ground for about twenty hours, however, the offensive odour abates, and the bird may be eaten by persons of strong appetites. It is found on the Tern Islands, where its nest is entirely composed of sea-weed, which is frequently heaped up to the height of two feet. In this rough nest are deposited from three to five eggs, of a pale bluish-white, with a rough surface. Cormorants were formerly trained in England to catch fish for the table. When so employed, their necks were encircled by a leather thong, to prevent them from swallowing the catch. The Chinese cormorant, (*Phylacrocorax siensis,*) or Leutze, as the Chinese call it, is commonly bred and instructed in the art of fishing.

Corn-crake, or Landrail, *korn'-kraik,* (*Ortygometra crex.*)—The corn-crake appears to be extensively spread over the whole continent of Europe, and in Holland it is specially abundant. It is migratory, arriving here about the beginning of May. It is about the size of a partridge. All the feathers of its upper part are blackish-brown in the middle, edged with ash-colour ; breast olive-ash ; throat, belly, and abdomen white. Its habits are extremely shy. It selects for its abode grassy meadows, osier-beds, and such places, where it may remain completely hidden. Its food is worms, snails, and insects. The nest is composed of tender water-flags and grasses, and from eight to twelve eggs, of a yellowish white, dotted with rusty spots.

Cornea, *kor'-ne-ă,* (Lat. *cornu,* a horn,) in Anat., is the name given to one of the coats of the eye, from its being of a horny consistence.

Coronellidæ, *kŏ-ro-nel'-lid-ee,* a family of colubine serpents, having the front teeth shortest, the belly flat, the back broad, and the head slightly papillar. One species (*Coronella austriaca*) inhabits England, and is always found on sandy soils.

Corophium, *ko-ro'-fi-um,* a genus of sessile-eyed amphipodous crustacea, having the lower antennæ enormously large and like legs. It is found in mud banks of tidal rivers, or on the sea-shore.

Corsira. (*See* Shrews.)

Corvus. (*See* Crow.)

Coryphene, *kŏ-ri-feen',* a beautiful fish, (*Coryphæna hippurus,*) sometimes called the Dorado, and by sailors the Dolphin, though erroneously. It belongs to the Acanthopterygii. This fish is well known as chasing the flying-fish, first driving them out of the water, and then snapping them up as they fall back again. When caught it is very brilliant, and the most beautiful colours play over its body during its dying struggles. It inhabits many of the warmer seas.

Cossus, *kos'-sus.* (*See* Goat-Moth.)

Cotile. (*See* Martin.)

Cotton-mouth. (*See* Cenchris.)

Coturnix. (*See* Quail.)

Coucal, Egyptian, *koo'-kăl,* (*Centropus ægyptius,*) a bird about fifteen inches long. The feathers of the head and neck are of a metallic greenish hue, which colour, passing to a duller tint, marks the bird's upper parts generally, while the under portions are white. They are solitary in their habits, breeding in holes in trees, and feeding on insects and small reptiles. Its note somewhat resembles that of our cuckoo ; indeed, the Arabs call the bird *hou-hou,* from its repetition of these syllables.

Couguar. (*See* Puma.)

Cow, *kow,* the female of the Bovine species.

Cow-bird, *kou'-burd,* an American cuckoo, which does not drop its eggs into the nests of other birds, but constructs a home for itself. It is sometimes called the Yellow-billed cuckoo.

Cow Troopial, (*Molothrus pecoris,*) a passerine bird of North America. Its most remarkable trait is, that, like the cuckoo, it deposits its eggs in strange nests. It is about the size of the thrush, and is chiefly black, with a violet tinge. The tail is slightly forked; legs and claws glossy black, and very muscular.

Coulterneb. (*See* Puffin.)

Courser, *kor'-ser*, a genus of birds (*Cursorius*) allied to the plovers, and remarkable for their speed.

Cowries, *kow'-rees*, (*Cypræidæ*,) a family of univalve shells, remarkable for the brilliancy of their colours, and the high polish of which they are susceptible. They abound both in the Old and New worlds, but their greatest development, both in point of size and number of species, takes place in warm climates. In the East Indies and many parts of Africa, cowries are used as current coin by the natives.

Coyote. (*See* Cajote.)

Coypu, *koi'-pu*, (*Myopotamus Coypus*,) a rodent animal, smaller than the beaver, but of many similar characteristics. Its habits are aquatic; it burrows near the margin of rivers, and swims with the greatest ease. Its hind feet are webbed; its head large and depressed; ears small and rounded; muzzle long and pointed, and ornamented with bristle-like whiskers. Its tail is round, instead of being flattened like the beaver's. It is peculiar to South America, and its skin forms the staple of a considerable trade. The skin is sometimes called *racoonda*, but better known by the name of *nutria*. It is largely used in the manufacture of "beaver" hats. Fifteen thousand skins have been received in a single year by a single firm.

Crab, *krăb*, (Sax. *crabba*.)—This name is popularly applied to the whole of the crustaceans belonging to the order Decapota. This order is divided into three sub-orders,—the Macrura, or *long-tailed crustacea*, to which the lobster and cray-fish belong; the Anomura, which appears to hold an intermediate position between the former and the third sub-order,—the Brachyura. To the latter the common crab belongs. This animal is thus characterised:—The abdomen is always converted into a short jointed tail, quite destitute of terminal appendages, and bent round so as to fold closely under the breast. The cephalo-thorax is usually of a more or less rounded form, geneally broader than long, and often produced in front into a point. The upper surface is entirely covered by a single plate (the carapace, or back.) The eyes and the inner antennæ, the latter of which are very short, can be entirely concealed within small cavities of the forehead. The outer antennæ are never of any great length, and the anterior feet are always converted into nippers. The four other pairs of legs are generally terminated only by single claws. The feet of the crab, although sometimes flattened, which assists the animal greatly in making progress through the water, are, as a rule, essentially made for pedestrianism. Its walk or run is of a very curious nature; and its gait, when alarmed, more nearly approaches that of a tipsy person than anything else; for, instead of making its way forward, it shuffles along sideways, but nevertheless with great rapidity. In some species of the Brachyura the young crabs undergo several metamorphoses before arriving at maturity; but in many others immediately they are hatched they resemble their parents in all but size. The common crab (*Cancer Pagurus*) inhabits deep water, and is caught either on the rocks at low tides, or by means of a trap—a basket—baited with meat or some animal garbage, into which the animal is easily enabled to crawl, but out of which the intellects of the crab are too dull to devise a means of escape. The small green crab (*Cancer mænas*) is also very common on all parts of our coast, but not so much valued as the former. A very curious species is the hermit-crab, belonging to the sub-order Anomura. This creature possessing a very soft abdomen, it would be very likely to be seized by some predacious fish, if it were exposed. To prevent this, the hermit-crab seeks for some empty tenement, wherein it may take up its abode. The habitation usually chosen is the shell of some univalve mollusc. "Into this spiral home the hermit-crab is coiled, and retains himself in this position by means of a sucker at the extremity of his tail, assisted by two or three rudimentary feet, which are developed upon the abdominal sac; and so firmly does he adhere to his castle, that he will allow himself to be torn to pieces rather than let go his hold. By protruding his body with its three pairs of legs from the orifice of the shell, the little hermit is enabled to walk with ease upon the sandy beach in search of his prey; but the moment danger threatens him, he disappears again into his cell, the orifice of which is then occupied by one of his claws, which is always larger than the other. As the crab does not possess the same power of adding to the size of the domicile that was enjoyed by the original tenant, he is compelled from time to time to change his residence for one a little larger, and often appears almost as difficult to please as a human householder in the same predicament. Often they may be seen crawling amongst the empty shells just thrown upon the beach, trying one after another, until they meet with one uniting all the conditions requisite for crustacean comfort; but, until this great object of their search is obtained, always returning to their old house after each unsuccessful trial." Dallas, from whom the above happy description is quoted, says, moreover, that "when two of them happen simultaneously to cast a longing eye upon some particular suitable residence, they often engage in a fierce battle for the possession of the coveted object, which the victor always carries off in triumph."

Crabronidæ, *kray-bron'-ĭd-ee*, a family of hymenopterous insects, having large and squared heads, and a combed spur on the front tibiæ. They are predacious, feeding on other insects.

Cramp-Fish. (*See* Torpedo.)

Crane, Common, (*Grus cinerea*.)—This bird is found in considerable flocks in the northern parts of Europe. It measures about five feet in length; general plumage ash-coloured, but forehead black; sides of the head and hind part of the neck white. On the upper part of the neck there is a bare ash-coloured space of about two inches, and above this the skin is naked and red, with a few coloured hairs. The pinion of each wing is furnished with an elegant tuft of curled feathers. The bill is long, straight, and compressed, obtuse towards the end, and with the lateral base deeply channelled. Its nest is usually constructed in some swampy tract or insulated ruin. It lays two eggs, of a pale dull-greenish colour, blotched with brown. Its food is frogs, snails, grain, vegetables, &c. When a flock congregated on a marsh compose themselves for slumber, some few are invariably wide awake, and stand perched on one leg, looking out for danger. Kolben, with an audacity that should direct particular scrutiny to anything else he may aver, says that these sentinel cranes hold in the tucked-away foot a large stone, so that, should it fall asleep, the falling of the stone would rouse the sleepers. The crane is a bird delighting in the wastes that lie on the edges of marshes, or that are subject to periodical overflowings by rivers. Such pasturage at one time abounded in England, and then the crane was well known amongst us, and its breeding encouraged, and a penalty enforced for disturbing its eggs. So long ago, however, as Pennant's time, the bird was regarded as having ceased to exist among us. In proof of the great favour the crane attained in the eyes of gourmands, Pegge relates, in his "Form of Curry," that "William the Conqueror was so exact, so nice and curious in his repast, that when his prime favourite, William Fitz-Osborne, who was dapifer or steward of his household, had the charge of the curry, served him with the flesh of a crane scarcely half roasted, the king was so highly exasperated that he lifted up his fist, and would have struck him, had not Eudo, who was appointed steward immediately after, warded off the blow." The Demoiselle crane (*Scops virgo*) is a native of Africa. It is, although smaller than the common crane, of much more graceful build and handsome plumage. The chief peculiarities are a tuft of snowy feathers, which pass off backwards from behind each eye, and the long-pointed feathers which hang loosely from the upper part of the breast. Its chief colours are silver-gray and black. The Crowned crane (*Balearica pavonina*) is somewhat smaller than the last-mentioned, and is chiefly known by the possession of a close tuft of velvety black feathers covering the fore part of the head, while behind them rises a remarkable crest of fine feathers twisted spirally, and fringed along its edges with a series of black-pointed hairs. Its cheeks and temples are entirely naked, and covered with a bright rosy red.

Crane-flies, a group of well-known dipterous insects, allied to the gnats, and popularly called Daddy-long-legs. Their larvæ are very destructive to turfing, feeding on the roots of grasses. They belong to the genus Tipula.

Crangon. (*See* Shrimp.)

Crax. (*See* Curassows.)

Crayfish, or Crawfish, *krai'-fish*, (*Astacus fluviatilis*,) a crustaceous animal, differing little in general appearance from the lobster. Species of this genus are found in almost all parts of the world. The flesh is reckoned cooling and nutritious. It lives best in rivers, where it takes up its habitation beneath stones and in holes in the banks, there lying in wait for the larvæ of insects, decomposing animal substances, and small fish.

Creeper, *kreep'-er*, (*Certhia.*)—With the exception of the yellow-crested wren, the common creeper (*Certhia familiaris*) is probably the smallest-bodied British bird: when fully grown its weight is only five drachms. The bill is hooked, the legs slender, and the toes and claws very long. The nest of the common creeper is built in a hole in the bark of a tree, and is formed externally of hay and lined with feathers. It is a constant resident in Britain, but, owing to its bustling habit and swift movements, is seldom seen even in localities where it abounds. The wall-creeper (*Certhia muraria*, Linn.) is a more rare bird in every other part of Europe save the south; in Spain and Italy it is common, as well as in Provençe, and it may be seen creeping on the outer walls of St Peter's, at Rome. Its colour is of a deep bluish-gray; the wing-coverts and middle quill-feathers black, those nearest the body edged with white. This bird clings to the vertical faces of walls and rocks, just as the common creeper attaches itself to the perpendicular surface of trees. Another species, the Curved-bill creeper, (*Dendrocolaptes procurvus*,) has its long bill curved like a sickle. It is a native of Brazil.

Cricetus. (*See* Hamster.)

Cricket, *krik'-et*, (Du. *krekel*,) (*Acheta domestica.*)—This well-known little insect has been, and is still, a subject of much delusion. Notwithstanding that modern naturalists have cleared up all mystery connected with the cricket, if ever any existed but in the rude and untaught mind, still, at the present day, there is many a household in England any member of which would associate the chirping of the cricket with some fatality, and consider it an alarming omen. Thanks, however, to the variety of superstition, by many persons it is considered as a sign of good luck, although with about as much reason as in the former notion. At any rate, it possesses the merit of being a less harmful superstition, and may, without much injury, remain, until a purer and truer knowledge shall dawn in the dark corners that are still untouched with the blaze of Progress. The cause of the chirping noise made by the cricket, and which is so familiar to the fireside listener during the cold winter evenings, is simply the friction of the wing-covers against each other. The house-cricket is about an inch in length, and the antennæ often half again as long as the whole body. It is found in various parts of Europe, more particularly in the south. In Great Britain it is very abundant. Only in the winter months does the cricket take up its abode with man, usually selecting rooms on the lower floor, and greatly affecting the kitchen, where there is generally no lack of food lying about. Sometimes it selects chinks and crevices in which to hide, and often burrows in the mortar, where, through the long evenings, it chirps continuously. Its monotonous chant is considered very amusing by some; by others, whose temperaments are of a nervous nature, it is thought to be disagreeable and irritating. In the summer, the cricket takes its departure, and finds an abode in the crevices of garden-walls and such-like places. At this season it does not forget its melody; but it is said, in the fine summer evenings, to chirp more pertinaciously. The field-cricket is also found in this country, but is not nearly so common as the preceding species. It is exceedingly reserved in its habits, avoids the society of man, and prefers hot, sandy localities; it burrows in the ground, and there lies all the year round. The field-cricket (*Gryllus campestris*) is carnivorous, and preys upon other insects. It is larger than the common species, and its chirp is much louder. Another interesting species is the mole-cricket, whose habits are very singular, and greatly resemble those of the animal from which it is named. In its structure, too, there is a remarkable similarity. This insect is continually engaged in excavating galleries under the earth, some of which are of considerable dimensions. To enable it to do this with perfection, its anterior limbs are connected into a pair of flat fossorial organs, which are in appearance much like the hand of the mole. In its burrowing processes, it does great injury to the roots of plants. With regard to its diet, little is positively known ; and whether it lives on vegetable or animal food, is still a matter of uncertainty. By some authorities, however, it is said to feed on both roots and insects. The female of this species prepares a large chamber wherein to lay her eggs, which are said to be from two to four hundred in number. Until after the first moult, the young remain together, but then take their departure, and commence burrowing on their own account. The mole-cricket is usually about two inches in length, and is of a brown colour. The most extraordinary cricket is that found in Sicily, (*Gryllus megacephalus,*) which chirps sufficiently loud, it is said, to be heard distinctly at a mile distant (!)

Crocodile Family, *krok'-o-dile*, (Gr. *krokodeilos,*) the largest order of the Saurian order of reptiles, called scientifically the *Loricata*, because the bodies are shielded by horny scales. The tail is flattened at the sides ; there are five anterior and four posterior toes, of which the three inner ones only on each foot are armed with claws ; all the toes are more or less joined by membranes. There is a single row of pointed teeth in each jaw, and the lower canine teeth fit into a notch in the edge of the upper jaw ; the tongue is fleshy, flat, and attached very nearly up to the edges, which led to the ancient belief that the crocodile was without a tongue. The back and tail are covered with large and strong square scales, elevated into a ridge on their middle. There is a deeply denticulated crest on the tail, at the base of which the crest becomes double. The scales of the belly are squared, delicate, and smooth. The nostrils are opened at the end of the muzzle by two small crescent-shaped slits, closed by small valves, and lead, by a long and straight canal pierced in the palatine and sphenoidal bones, to the bottom of the back part of the mouth. As the lower jaw is prolonged behind the skull, the upper jaw has the appearance of mobility, but it only moves in concert with the whole of the head. The external ear is shut at will by two fleshy lips. The eye has three lids. Under the throat are two small glandular orifices, whence issue a musky secretion. Like the rest of the Lacertæ, crocodiles are oviparous. Their eggs are deposited in the sand or mud on the banks of the rivers they frequent ; and the young, when hatched, immediately proceed to the water. The egg of the crocodile is not much larger than that of the goose ; but it is very much harder, and its form more oblong. As is the case with many newly-born creatures, the head of the young crocodile seems monstrously large as compared with the rest of its body. "The laying of the eggs," says M. Ricord, "takes place in April, and the number amounts to from twenty to twenty-five, more or less, laid at many times. The female deposits them in the sand with little care, and scarcely covers them. I have met with them in the lime which the masons have left on the banks of the river. If I have reckoned right, the young ones come forth on the fortieth day, when the weather is not too cold. At their birth they are five or six inches in length. They are hatched alone ; and, as they can do without nourishment while coming out of the egg, the female is in no hurry to bring it to them. She leads them towards the water and into the mud, and disgorges for them half-digested food. The male takes no account of them." In crocodiles the number of teeth does not vary with age, as in other animals, the teeth being hollowed at the base in such a manner as to serve for the case or sheath of the germ of the tooth destined to replace it. The teeth are numerous, large, and of unequal length. Cuvier says that the crocodile cannot swallow while in the water, but that it first drowns its prey and places it in some nook under water, where it is allowed to putrefy before it is eaten. This is denied by certain modern travellers and naturalists. The prey of the crocodile is chiefly fish, but it derives a considerable part of its sustenance by lying in wait in the evening at the water's edge, and hauling into the water any small quadruped that may come to drink. They have been killed in Upper Egypt exceeding thirty feet in length. Its colour, when full grown, is blackish-brown above and yellowish-white beneath ; the upper parts of the legs and the sides are varied with deep yellow, and parts of the body bear a green tinge. No living specimen of this family is found in Europe, nor has any at present been discovered in Australia. Africa is the native country of the crocodile, and it is also found in Madagascar. The crocodiles are generally considered as forming a natural passage from the Saurians to the Chelonians, to the last genera of which, in certain points of their conformation and habits, they nearly approximate. The Crocodilidæ are divided into two great families,—the crocodiles proper, which are distributed in the Old and New worlds ; and the alligators, which are peculiar to America. As examples of the crocodiles, may be mentioned, several species of the genus Crocodilus, inhabiting Africa, Asia, and America, the false gavials of Africa, and the true gavials of India. Of the alligators, we may mention the true alligators and the yacare.

Crossarchus. (*See* Kusimanse.)

Crossbill, *kros'-bil*, (*Loxia curvirostra.*)—The range of the crossbill extends from the north of Europe as far as Greenland. The most singular characteristic of this bird is its beak, the upper and lower mandibles being equally curved, hooked, and the elongated points crossing each other. Buffon speaks of this peculiarity as an error and defect of nature, which clearly enough shows that he was totally unacquainted with the bird's nature. Its favourite food is the fruit of the pine, and of the efficacy of the crossed mandibles in splitting and extracting the kernels from nuts there can be no doubt. "The beak of the crossbill is altogether unique in form ; the mandibles do not lie upon each other with their lateral edges in opposition, as in other birds, but curve to the right and to the left, and always in opposite directions to each other. In some specimens the upper mandible is turned to the right, the lower mandible curved to the left ; in others the position of the mandibles is reversed in their direction. In the specimen I examined, the upper mandible curved downwards, and to the left; the under portion turned upwards, and to the right. When holding the head of this bird in my fingers, I found I could bring the point of the under mandible in a line underneath and touching the point of the upper, but not beyond it towards the left side, while on its own side the point passed with ease to a distance of three-eighths of an inch. The upper mandible has a limited degree of motion on the cranium, the superior maxillary and nasal bones being united to the frontal by a flexible bony lamina."—(*Yarrell.*) The chief colour of the crossbill's plumage is ashy-gray, with a greenish tinge on the upper parts, while the lower parts are yellowish green. Its bill is horn-colour; its length about six inches. This is the plumage of the adult bird; after the first moult, however, and until the bird is a year old, all its upper and lower parts are of a tarnished red, more or less tinged with green and yellow; while the lower coverts of the tail are white, with a brown spot in the centre.

CROSSOPUS. (*See* SHREWS.)

CROTALIDÆ, *kro-tal'-lid-ee*, a family of viperine serpents, having a large pit on each side of the head, between the eye and the nostril. The rattlesnake and other venomous serpents belong to this family.

CROTALUS. (*See* RATTLESNAKE.)

CROTOPHAGA. (*See* BLACKBIRD-SAVANNAH.)

CROW, COMMON or CARRION, *kro*, (Sax. *crawe,*) (*Corvus Corone.*)—This common British bird is, perhaps, as well-known, and at the same time as little liked, as any feathered creature. The farmer hates him for his appetite; the rural inhabitants hate him because so does the farmer; and, on account of his sombre attire, unmusical voice, and carrion propensities, those unconnected with the agricultural interest are seldom squeamish about the fate of a crow, nor apt to regard as aught but a justly-punished criminal the wide-spread and gibbeted carcass of poor *corvus* set out, as in a pea-field, as a warning to its relicts. Did it not happen that the crow is gifted with an extraordinary amount of intelligence, he would ere this have been banished from the face of the land. The carrion crow is spread over the Old and New continents, and feeds, like the ravens, on any sort of animal offal, or, when this is not attainable, on worms, moles, mice, caterpillars, grubs, beetles, &c. In the winter it associates with the rooks, and may be seen with them busily turning over the earth in search of food. The nest, like that of the rook, is constructed at the summit of a tree of slender branches, matted with clay and horse-dung. The hen lays four or five eggs of a palish green, sometimes blurred and spotted with a darker colour. They lay but once in the year, unless the young or the eggs be destroyed by accident. It is said that the crow may be domesticated, and taught to speak as distinctly as the raven. "The carrion crow will feed voraciously on ripe cherries; and in the autumn he will be seen in the walnut-trees, carrying off from time to time a few of the nuts. With the exception of these two petty acts of depredation, he does very little injury to man during nine or ten months of the year; and if in this period he is to be called over the coals for occasionally throttling an unprotected leveret or a stray partridge, he may fairly meet the accusation by a set-off in his account of millions of noxious insects destroyed by him. However, in the spring of the year, when he has a nest full of young ones to provide for, and when these young begin to give him broad hints that their stomachs would like something of a more solid and substantial nature than mere worms and caterpillars, his attention to game is enough to alarm the stoutest-hearted squire or henwife. These personages have long sworn an eternal enmity to him, and he now, in his turn, visits, to their sorrow, the rising hopes of the manor with ominous aspect; and he assaults the broods of the duck-pond in revenge, as it were, for the many attempts both squire and henwife have made to rob and strangle him."—(*Waterton.*) The Hooded crow (*Corvus Cornix*) is rather smaller than the preceding, with black head, throat, wings, and tail. Its name is derived from the contrasted black head and gray body. It is more ferocious than the carrion crow, and has been known to pick out the eyes of lambs, and even of horses helplessly hampered in bogs. In certain parts of the Faroe Islands it is no uncommon thing for these birds to assemble in great force, say a thousand in number, and, while the rest appear to sit wrapped in the profoundest attention, one or another will flutter his wings and "caw" at a tremendous rate. When he has done, another begins; and so the meeting continues for an hour or so. Then they break up, and it is not uncommon to find one or two birds left behind dead. The natives have a belief that these meetings refer to the criminal behaviour of some of the flock, and that they, if found guilty, are executed on the spot. The Alpine crow, or chocard, (*Pyrrhocorax alpinus,*) has the compressed arched and sloped beak of the blackbird; but its nostrils are covered with feathers like those of the crow, to which it has been annexed. It builds in the clefts of rocks of the higher mountains, descending in immense flocks to the valleys. The nut-cracker crow is, although not a true crow, allied to the family in several particulars. It is not uncommon in many parts of Europe, but rarely visits England. Pennant remarks, that the specimen from which his description was taken was the only one that he had ever heard of that was shot in the three kingdoms. The Bald crow (*Picothartes gymnocephalus*) has the top of its head quite bare, and the upper part of the neck covered with down like that of a vulture. It inhabits Africa. The Fish crow (*Corvus ossifragus*) inhabits America, and haunts rivers and lakes, feeding on fish and reptiles. The Great Bill crow (*Corvus crassirostris*) is remarkable for its huge beak, which is enormously high and strong, like that of the puffin. It inhabits Abyssinia. The handsome Nut-cracker crow (*Nucifraga caryocatactes*) derives its name from its habits. It is very seldom seen in England. The Philippine crow (*Corvus sinensis*) is a very beautiful bird, notable for the crest which overhangs the head, and can be raised or lowered at pleasure. The birds called the King crow and the Piping crow belong to other families, and are not described in this place.

CRYPSIRHINA. (*See* BENTEOT.)

CRUSTACEA, *krus-tai'-she-ă*, (Lat. *crusta*, a hard shell,) a class of articulated animals whose external covering is less solid than that of the majority of testaceous mollusca, but much firmer and harder than the skin of the naked mollusca. This tegumentary skeleton may be regarded as a kind of epidermis, for beneath it is found a membrane like the true skin of higher animals. At certain times this solid envelop detaches itself and falls off, as the epidermis of reptiles separates itself from their bodies. With the crawfish this shell-shedding, or *ecdysis*, as it is called, is preceded by a few days' sickness and fasting, and at that time the carapace, or upper shell, becomes loosened from the corium to which it is attached. The corium begins forthwith to secrete a new shell, which, at first soft and membranous, becomes gradually harder and harder, and is at last calcareous. When all connexion is broken off, the animal sets about freeing itself of the incumbrance. It rubs its legs one against the other, and finally throws itself upon its back, and in that situation begins to swell out and shake itself, till it tears the membrane that attaches the carapace to the abdomen. The greatest difficulty occurs in freeing the extremities, nor could they be extricated at all, did not the old shell split longitudinally. The entire process is completed in half-an-hour; but it takes from twenty hours to three days for the conversion of the soft and membranous integuments into a firm case similar to that lately abandoned. While this transformation is taking place, the muscles of the animal are flaccid, and the flesh altogether unfit to be eaten. An exception to this rule, however, would seem to occur in the case of the land crab; for, according to all that has been written on the subject, the latter animal is never so delicious as during the moulting period. They are divided into two sub-classes,—the Podophthalmata, or stalk-eyed crustacea, whose eyes are set on the ends of movable footstalks; and the Edriophthalmata, or sessile-eyed crustacea, whose eyes are set on the head, without any footstalks.

Cryptoprocta, *krip-to-prok'-tah*, a genus of viverine animals inhabiting Madagascar. It is a small though fierce and active creature, feeding on other animals, and a good climber. The hind-quarters suddenly taper away from the haunch to the tail.

Cuckoo, *kook'-oo*, (Lat. *cuculus*, Fr. *coucou*,) (*Cuculus canorus*.)—This bird, which derives its name from the peculiar sound of its note, is very widely diffused. It is found in India and in Africa, and migrates northward in summer, even to Lapland and Kamtschatka. It makes its appearance amongst us in April, and disappears again by about the middle of August. It would seem that love is a passion that occupies very little of the cuckoo's consideration. There is no pairing or continued attachment between the male and female, and the latter generally, if not always, lays her eggs in the nest of some other smaller bird, leaving their hatching and future maintenance to fate. The gratitude of the foster child is of a piece with its parent's heartlessness. Mr Selby asserts that, when hatched, the young cuckoo has between its shoulders a depression in which it lodges any burden it wishes to carry to the edge of the nest for ejectment; that, at the expiration of twelve days, the hollow is filled up, and that, should the proper occupants of the nest chance to remain till then, the young cuckoo no more molests them. The hedge-sparrow, the pied wagtail, and the yellow-hammer, are the birds commonly selected by the cuckoo for imposition. In the early part of the summer of 1828, a cuckoo, having previously turned out the eggs from a water wagtail's nest, which was built in a small hole in a garden wall at Arbury, (the seat of Francis Newdegate, Esq.,) deposited her own egg in their place. When the egg was hatched, the young intruder was fed by the water wagtails till he became too bulky for his confined and narrow quarters, and in a fidgety fit fell to the ground. In this predicament he was found by the gardener, who picked him up and put him into a wire cage, which was placed on the top of a wall not far from the place of his birth. Instead, however, of its foster parent the wagtail coming to feed it, there appeared at its prison-bars a friendly hedge-sparrow, who, day after day and at very frequent intervals, continued to bring it food, until it was well fledged and big enough to be set at liberty. Bishop Stanley relates an instance of an unfledged cuckoo being placed in the same cage with a young thrush. The cuckoo was either too idle or unable to feed itself; so the good-natured thrush kindly performed the operation for him. One day a tempting worm was offered at the wires, and at once the thrush went to it. Whether its original intention was to give it to its patient can never be known; if so, however, the sleek plump thing hanging in the thrush's very beak was too great a temptation; it swallowed it. It seemed that the cuckoo had made sure that the worm was coming up to him, and when he discovered his error he hopped fiercely down, and, with one blow of its cruel beak, took one of the thrush's eyes out. Even in this maimed condition the patient nurse continued to wait on its tyrant patient, and never ceased to do so till the cuckoo was big enough to shift for itself. The Gilded cuckoo (*Cuculus auratus*) is inhabitant of the Cape of Good Hope, and extremely common in Caffraria. It is a very beautiful bird, the chief of the plumage being brilliant green with golden reflections. It is about seven inches long. Like the common cuckoo, it deposits its egg in the nests of other birds, and, unless Vaillant was mistaken, in a way that puts aside the notion that the hen-cuckoo *lays* them where they are to be hatched by another bird. While out shooting with his man Klaas, he brought down a golden cuckoo with one of the eggs of its species, and evidently freshly laid, *in its throat;* and it then occurred to him that his attendant had frequently brought him a bird of this kind, with the exclamation, "This one dropped an egg as she fell from the tree." Later in the day another cuckoo was shot by Vaillant, with an egg in its gullet. "I was convinced from this circumstance," writes the sporting naturalist, "that the female cuckoo deposits her egg in the nest of another bird by conveying it thither in her beak." Besides those noticed there is the Spotted cuckoo, (*Oxylophus glandarius*,) an inhabitant of the north of Europe; the Oriental cuckoo, (*Eudynamys orientalis*,) found in the East Indies; and the Yellow-billed American cuckoo, (*Coccygus americanus*,) likewise called the Cow-bird and the Rain-crow. For Pheasant cuckoo, *see* CENTROPUS.

Cuckoo-spit, a popular name for the secretion poured out by the larva of the frog-hopper, (*Aphrophora spumaria*.)

Cucujo, *koo-koo-hoh'*, a species of fire-fly, *q.v.*

Cuculus. (*See* Cuckoo.)

Culex, *ku'-leks*, (Lat., a gnat,) in Ent., a genus of the Diptera, or two-winged insects, belonging to the Gnat family. They are characterised by their length of proboscis, and their finely-tufted antennæ. (*See* Gnat, Mosquito.)

Cuon. (*See* Dhole.)

Curassows, *kew'-ras-sow*, a group of birds of the genus Cræx. They are large, handsome birds, allied to the turkey, and their flesh is very delicate. There is a fine collection of these birds in the Zoological Gardens.

Curlew, *kŭr-loo'*, (Fr. *courlis* or *corlieu*,) (*Numenius arquatus.*)—The genus to which this bird belongs is characterised by a long, slender, incurved bill, slightly compressed and furrowed for three-fourths of its entire length; it has a blunt tip; wings ample; tarsi naked above the joints. In length the curlew measures about two feet, and, in the case of the male, the whole plumage is bright ash-colour, with longitudinal brown spots on the head and breast; upper mandible blackish brown; lower mandible flesh-colour; iris brown; feet deep ash. The curlew is very common in most parts of Europe, and occurs in parts of Asia. It inhabits the vicinity of waters and marshy wastes, and feeds on earth-worms, slugs, small testaceans, and insects. Its nest, a careless construction of dried grass and leaves, is usually placed among the rushes. Its eggs are large, over two and a half inches in length, of an olive-green colour, blotched with deep brown.

Cursorius. (*See* Courser.)

Curucuru. (*See* Bushmaster.)

Cuscus, *kus'-kus*, a genus of marsupial animals of Australia, which are known by the structure of the tail, which is naked, except at its base. The tail is prehensile, and used in suspending the animal to the branches. Both the skin and flesh are valuable. The former is exceedingly variable in colour, but is generally of a whitish hue, spotted with red-brown or black.

Cushat. (*See* Pigeon.)

Cuttle-fish, *kut'-tl fish*, (*Octopus*,) (Ang.-Sax.,) a molluscous animal of the genus Sepia, order Cephalopoda. The body is somewhat oval, but broader at the head than at the extremity, which is obtusely pointed. The head is furnished with eight arms and two feet, the latter being nearly similar in structure to the arms or tentacula, but considerably longer in their dimensions. A neck divides the head from the body, which is furnished on each side, throughout its entire length, with a narrow fin. The back of the cuttle-fish is strengthened by a calcareous plate, well known as the *cuttlefish-bone*. This bone was in former times in great repute among apothecaries as an absorbent; but now it is chiefly used in the form of a powder, to polish the softer metals. The term bone, however, is properly inapplicable to the calcareous shield of the cuttle-fish; as in its composition it is exactly similar to shell, and consists of various membranes hardened by carbonate of lime, without the smallest mixture of phosphate. This animal is sometimes termed the Ink-fish, a name that arises from the circumstance that beneath its throat is a bladder, in which is secreted a fluid black as the blackest ink, and which, when annoyed or pursued, it ejects, so staining the water around it, that it is an easy matter for it to escape unperceived. It likewise possesses the chameleon-like power of changing its colour, a circumstance that did not escape the observation of Mr Darwin while at the Cape de Verd Islands. "I was much amused by the various arts to escape detection practised by one individual, which seemed fully aware that I was watching it. Remaining for a time motionless, it would then stealthily advance an inch or two, like a cat after a mouse, sometimes changing its colour. It thus proceeded till, having gained a deeper part, it darted away, leaving a dusky train of ink to hide the hole into which it had crawled." There is a serious belief among fishermen generally that the larger cephalopoda are highly dangerous, from twisting their arms round swimmers, and thus impeding their motions. "Some of these, particularly those of Sicily, are sometimes caught of an enormous size, with their arms fully as long as an ordinary man's leg: but notwithstanding the marvellous stories related and believed by their captors, we did not hear of any well-authenticated instance of these animals having actually occasioned loss of life."—(Swainson's *Instincts of Animals.*) The squids, sepias, &c., belong to this group.

Cuxio. (*See* Brachyurus.)

Cyanæa, *sy-an-ee'-a*, a genus of Acalephæ, belonging to the covered-eyed medusa. One species of this genus (*Cyanæa capillata*) is found in our own seas, and is extremely venomous, its long trailing threads stinging worse than nettles.

Cyclops, *sy'-klops*, a genus of Entomostraca, having the foot-jaws very large and branched. It is very common in ponds.

Cyclothurus, *sy-cloth-u'-rus*, a genus of ant-eaters, natives of Brazil. The Little ant-eater belongs to this genus. It is a very small animal, climbs well, and is remarkable for the wide and flattened ribs, which overlap each other. The tail is prehensile.

Cygnet. (*See* Swan.)

Cynictis. (*See* Meerkat.)

Cynipidæ, *sin-ip'-ĭd-ee*, a family of hymenopterous insects, popularly called Gall-insects, and having an interior spiral ovipositor. The gall of commerce is formed by one of these insects.

Cypræa. (*See* Cowries.)

Cyprinus (*See* Carp.)

Cypselus. (*See* Swift.)

D.

Dab, *dăb*, (*Platessa limanda*,) a common flat fish, well known in the London market. Its average size is eight or nine inches in length, and six or seven in breadth. Its upper side is pale brown, and its under parts white. It is usually caught with plaice and flounders. The three spring months constitute its "season."

Dabchick, *dăb'-tshik*, or Little Grebe, (*Podiceps minor*,) a small bird nine or ten inches in length, commonly found about lakes and fish-ponds. It is an exceedingly active swimmer, and dives with great ease. It progresses under water with considerable rapidity, with the aid of both wings and feet. The larger grebes do not appear to use their wings in this way. (*See* Grebe.)

Daboia. (*See* Tic-polonga.)

Dace, *dais*, (Du. *daas*,) (*Cyprinus leuciscus*,) a small fish found in clear and quiet streams. Its head is small, muzzle pointed; back slightly elevated, and tail slightly forked. The scales of the dace are rather small. It is gregarious. The food is worms and other soft animal substances. April and May are the prime times to fish for dace.

Dacelo, *da-see'-lo*, a genus of kingfishers, found in Australia and New Guinea, having a long bill very broad at the base. (*See* Jackass, Laughing.)

Daddy-long-legs. (*See* Crane-flies.)

Daesman, *days'-man*, (*Galemys Pyrenaica*,) a remarkable animal, allied to the shrews, and found in several parts of Europe. It has a long snout, almost like an elephant's trunk, and the feet are deeply webbed. It lives in burrows at the side of streams, and feeds on insects. Owing to a powerful musky odour which it exhales, it is often, though falsely, called the Musk Rat. The name is sometimes spelt Desman.

Dafila. (*See* Pintail Duck.)

Dama. (*See* Fallow Deer.)

Damalis. (*See* Sassaby.)

Daphniadæ, *daf-ny'-ăd-ee*, a family of Entomostraca, belonging to the order Cladocera. They have the upper antennæ small, are enclosed in a shell, and have five or six pairs of feet. The water-flea (*Daphnia pulex*) is a good example of this family.

Darter, *dar'-ter*, (*Plotus Anhinga*, Linn.)—In general form this bird resembles the cormorant, but the head is smaller, and supported on a very long and slender neck. The beak is perfectly straight and pointed, with the edges of the mandibles denticulated. Buffon, in allusion to the darter, says, "It offers us a reptile grafted on the body of a bird." It is sometimes called the Snake-bird. Its habits while in the water have contributed not a little to its name. It generally swims with its body immerged, especially when apprehensive of danger, its long neck extending above the surface, and vibrating in a peculiar manner. "Whether the darter be swimming or flying, it is certain that the most striking and remarkable part of its body is its long slender neck, which is continually in tremulous oscillation. In flight alone it is unmoved and stretched out, and forms, with the tail, a straight horizontal line. Its long tail, composed of strong and elastic feathers, serves as a rudder when swimming submerged in pursuit of fishes, upon which it principally feeds. When the darter seizes a small fish, it swallows it entire, but if it be too large, it carries it to a rock or the trunk of a tree, and, fixing it beneath one of its feet, cuts it in two by a stroke of its bill. It establishes its nest on trees or rocks in the vicinity of waters."—(*Temminck.*) The darter is found in the warmer parts of the world, in America, and Africa. Although of aquatic habits, it is said to build in trees.

Das Adder, (*Clotho nasicornis*,) a venomous snake allied to the puff adder, *q. v.*, and remarkable for the long curved horn on the nose. It is sometimes called the River Jack.

Dasyprocta. (*See* Agouti.)

Dasyures, *dă-se-u'-res*, (Gr. *dasus*, hairy; *ouros*, tail.)—This family includes the largest of the rapacious marsupials. The largest of the species (*Diabolus ursinus*) measures about eighteen inches long in the body, and is covered with long thick hair, of a black colour. It is a native of Van Diemen's Land, where it is commonly known as "the devil." It is chiefly destructive among sheep, and, despite its small size, is capable of doing immense mischief among the penned flocks. When Van Diemen's Land was first colonised, "devils" were very abundant; but they are now for the most part banished to the woods in the unfrequented parts of the country, where they subsist on small quadrupeds and birds. The feet of the dasyurus are formed for terrestrial progression; the anterior have five toes, and the hind ones four, all perfectly separate, and armed with curved claws. The deficient toe of the hind feet is sometimes represented by a sort of tubercle, which, however, does not reach the ground. The teeth are usually forty-six in number; the form of the molars in the upper jaw is usually irregularly triangular, with three points. The dasyures are evidently analogous to the ordinary carnivorous quadrupeds, not only in their ferocity and carnivorous propensities, but also more or less in form.

Date Shells. (*See* Lithodomus.)

Dauw. (*See* Zebra, Burchell's.)

Dayal, *day'-al*, (*Copsychus saularis*,) a bird belonging to the warblers that inhabit India and Ceylon, and is often caught and tamed, being remarkable for its spirit in captivity. It is usually employed after the fashion of gamecocks, and will fight nearly as bravely.

Day-fly. (*See* Ephemera.)

Death's-head Hawk-moth, (*Acherontia atropos*,) a lepidopterous insect of the family Sphingidæ. It is a species of hawk-moth found in several places in England, and in nearly every quarter of the globe. Its length across the wings is nearly five inches; its body is of a yellowish colour, with black stripes; the markings upon the back of the thorax are faint, but bear a close resemblance to a skull or death's-head, from which it derives its name. The wings are dark-coloured, being mottled with yellow, brown, and black. The caterpillar of the death's-head moth is greenish-yellow; the back is covered with black specks, with transverse lines of blue and white. It is often found feeding upon the leaves of potatoes. The moth itself is mostly seen flying during the morning and evening in autumn. As it flies it utters a low plaintive sound, and this, together with the death's-head mark upon the thorax, have caused it to be generally regarded with disfavour. How it contrives to make the noise is not known. Another strange property possessed by the death's-head hawk-moth, is that it is able to enter and plunder beehives with perfect impunity.

Death-watch, (*Anobium tesselatum.*)—There are certain superstitions that, once rooted in the light soil of a small mind, can never be eradicated or grubbed out by the keenest weapons common sense can bring to bear against them. The insect under consideration is a case in point; and there can be little doubt that this tiny beetle has caused more quaking and consternation than ever did *Tigris regalis*, or the king of beasts itself. Authors were formerly but ill-agreed as to the insect emitting the dolorous ticking. Some attributed it to a spider, others to a wood-louse. It is, however, now generally received as authentic that the "death-watch" is produced by certain beetles belonging to the timber-boring genus Anobium. The insect in question is of a grayish-brown colour, about a quarter of an inch in length, and moderately thick in proportion; the wing-shells are marked with irregular variegations lighter than the ground-colour. The ticking noise is thus produced:—raising itself upon its hind legs, with the body somewhat inclined, it beats its head with great force and agility against the woodwork on which it is standing. The general number of distinct strokes in succession is from seven to eleven. They follow each other quickly, and are repeated at uncertain intervals. It is said that this insect, if caught and confined on a table, may be taught to knock in reply to a tap of the finger-nail. This training, however, must be a work of some little time, for it is well known that the death-watch, as soon as touched, will contract its legs and counterfeit death, maintaining the imposition even when subjected to a heat fierce enough almost to roast them. The ticking is merely the call of either sex to its mate, and may be considered analogous to the call of birds. Says Sir Thomas Brown in his learned "Pseudodoxia Epidemica," "He that could eradicate this error from the minds of the people would save from many a cold sweat the meticulous heads of nurses and grandmothers."

DEER, *deer*, (Sax. *deor*,) (*Cervus*,) a Linnæan genus of ruminant quadrupeds, constituting the family Cervidæ. The chief characteristics of the deer tribe are, gracefulness of form, fleetness, and neatness and strength of limb; they have a long neck, small head, which is carried high, large full eyes, and large ears: they have no cutting teeth in the upper, but eight in the lower jaw; the males have usually two short canines in the upper, but neither sex has any in the lower jaw. They are distinguished from all other ruminants by their branching antlers, or horns, which, in most of the species, exist in the male only. Unlike the horns of the ox, the antlers of the deer are deciduous, falling off every year after the breeding season, and renewed before that exciting period again returns. Each year, until the animal attains old age, the horns increase in size both in breadth of palmation and number of branches; when, however, the animal grows so old as to cease to be affected at one season more than another, the horns, although renewed, diminish in size at each renewal. It has been clearly ascertained that the size and development of the antlers are closely connected with the sexual system. The deer's horns are produced by an action analogous to that by which injuries to the bones are repaired. The process forming the base of the horn is covered by a skin, beneath which a sort of inflammation is set up; this produces cartilaginous matter, which increases rapidly in amount, gradually becomes ossified, and finally forms the horn, which, when mature, is still covered with the vascular skin beneath which it has been formed. This, however, dries up and peels off soon after the complete development of the organs, and the latter then consist of bare bone. The growth of the horn is attended by considerable heat, and the blood-vessels which supply the head enlarge in size. It is rather curious that cast horns are seldom or never found in localities even where it is certain that hundreds of antlers must have been shed. This, however, is not the only instance of the mysterious disappearance of osseous matter. In the forests of Ceylon, where hundreds of elephants must die in the course of a single year, the skeleton of that gigantic animal is, as is related on eminent authority, *never* found. (*See* ELEPHANT.) The species of Cervidæ are very numerous, and dispersed generally through the world, excepting Australia and the south of Africa. Deer are pretty uniformly clothed with hair longer and thicker on those which inhabit cold, than those which inhabit hot climates. The ancient customs and laws of "venerie," that noble science which our ancestors looked upon as one of the first accomplishments of the high-bred noble, and a knowledge of which was essential to his education, were formal and technical to a most absurd degree. A few of the terms betokening the different ages of the stag and hind are still retained, though somewhat altered. The young of either sex is called a calf. After a few months the male becomes distinguished by the growth of the bossets or frontal protuberances on which the horns are afterwards developed, which, during the first year, are merely rounded knobs; from whence he takes the name of "Knobber." In the second year they are longer and pointed, and are called dags, and the animal has now the name of "Brocket." In the third year, the first, or *brow antler*, has made its appearance, and the deer becomes a "Spayad." In the fourth the *bez antler* is added, and he is then termed a "Staggard." He is a stag in the fifth year, when the third antler, or "Royal," appears; and in the sixth, the commencement of the *sur royal* or crown, is formed, when he takes the name of hart, and retains it through his life. At this time he is called a hart or stag of ten, probably because the branches, including the *sur royal*, frequently amount to that number. After the seventh year he is said to be *croched*, or *palmed*, or *crowned*, according to the number of branches composing the *sur royal*. The female is a *calf* in the first year, a *brocket's sister* in the second, and in the third, and afterwards, a hind.—*Ref.* Bell's *British Quadrupeds.*

DEERMOUSE, *deer'-mous*, (*Merionis*,) a genus of American rodent quadrupeds. The deer-mouse is common in Canada. It is about the size of a mouse, with a very long tail, and very long and slender hind legs. It is capable of making leaps of four or five yards. It burrows, and passes the winter in a lethargic state.

DEINACRIDA, *di-nă-kri'-dă*, a genus of the Cricket tribe, abundant in New Zealand, where it inhabits decaying trees and chinks and crannies in old woodwork. It is carnivorous, and its bite is very severe.

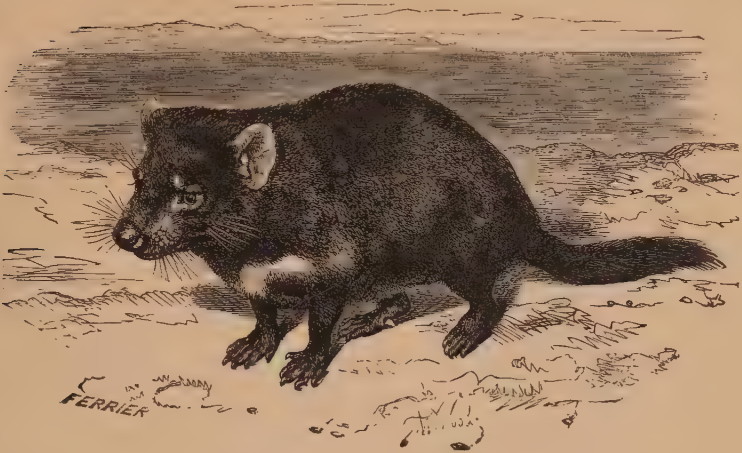
DELPHINUS. (*See* DOLPHIN.)

DELTOID, *del'-toid*, (Gr. Δ *delta*,) in Anat., is a muscle of the shoulder, which moves the arm either forward, backward, or upward. It is so called from its resemblance to the Greek letter *delta*. In Bot., the term deltoid is applied to a leaf of triangular form.

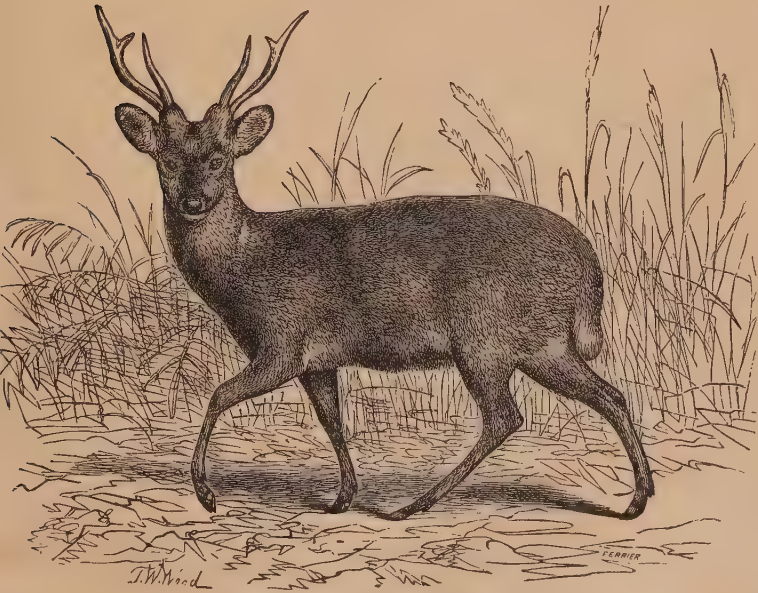
DELUNDUNG, *dee-lun'-dung*, a pretty animal, allied to the civets, and a native of Java and Malacca. Its scientific name is *Linsang gracilis*.

DENDROCOLAPTES. (*See* CREEPERS.)

DENDROLEGUS, *den-drol'-e-gus*, (Gr. *dendron*, tree; *lego*, I choose,) a genus of marsupialian



Dasyure, The Ursine; or Tasmanian Devil (Diabolus ursinus).



Deer, The Hog (Cervus porcinus).

animals belonging to the Kangaroo family. They, however, differ considerably from the rest by their adaptation to an arboreal life. The size of the animals belonging to this family differs considerably, some of them measuring more than four feet in length, independent of the sweeping tail; while others (*see* KANGAROO RAT) are no larger than a small rabbit. The tree kangaroos are found rather plentifully in New Guinea.

DENDROPHIDÆ, *den-drof'-ĭd-ee*, a genus of colubrine serpents, commonly called Tree-snakes. They are very long and slender, and the upper jaw projects beyond the lower. Many of them are decorated with very brilliant colours, green predominating.

DENDROSAURA, or TREE-LIZARDS, *den-dro-saw'-ră*, (Gr. *dendron*, tree; *sauros*, lizard,) the term applied to a group of reptiles, of which the chameleon may be regarded as the type.

DENTIROSTRES, *den-te-ros'-trees*, (Lat. *dens*, tooth; *rostrum*, beak,) birds of predatory habits, and distinguished by the upper mandible being notched on either side. The butcher-bird belongs to this order. (*See* BUTCHER-BIRD.)

DENTALIA. (*See* ELEPHANT'S TUSK.)

DERMESTIDÆ, *der-mes'-ti-de*, (Gr. *derma*, skin; *esthio*, I eat,) small beetles of a very destructive character. Nothing seems too tough for their digestion. "Although obnoxious in many respects, the insects of this family are of infinite service in the economy of nature, by causing the rapid decomposition of animal matter into a substance fitted for the improvement of the soil, and by their labours, united with those of the Silphæ, Necrophori, &c., destroying such portions of these remains as are left untouched by the flesh-flies, which only consume the soft portions of the carcases."—(*Westwood.*) The best known of the dermestes is *D. lardarius*, or bacon-beetle, a name applied through the insect's real or supposed fondness for bacon. It is about a third of an inch in length, and of a dusky brown colour, with the upper half of the wing-shells ash-coloured, and marked with black spots.

DERMIS. (*See* SKIN.)

DESMAN. (*See* DAESMAN.)

DEVELOPMENT. (*See* PHYSIOLOGY.)

DEVELOPMENT THEORY, *de-vel'-op-ment the'-o-re*, (Fr. *développer*, to develop; *théorie*, theory,) a theory originally propounded by the author of a work entitled "Vestiges of the Natural History of Creation," published in the year 1844. In this work the author first states that animal and vegetable life have progressed gradually on the globe. With regard to animal life, and arguing from fossil remains, he places the order or progression as follows:—First, an era of invertebrate animals; second, a period during which fishes were the only vertebrate form of being; then a period when reptiles were seen in addition, but without birds or mammalia; next a time when the last were added, but without man; and finally, the present era, in which that master species has existed in supremacy over all. Taking creation, then, as a broad course of progressive organisation, the theory of development is thus set forth:—All animal and vegetable organisms commence with a simple cell, of which it is impossible in any case to tell to what form it is destined to advance. A series of changes takes place, by the careful examination of which it is possible to determine to which class the future animal or vegetable will belong. According to the theory as enunciated by Von Bär, "a heterogeneous, or special structure, arises out of one more homogeneous or general, and this by a gradual change." At the same time it is contended that the embryo of each grade of being passes through the general conditions of the embryos of the grades beneath it. In an embryo of the vertebrate sub-kingdom can be traced the change which will determine whether it will belong to the fish, reptile, bird, or mammal class. In an embryo of the mammal class, the characters of the particular order are next determined; and afterwards those of the family, genus, species, sex, and individual in succession. As an illustration,—"There is no essential difference between the vertebral column of the early embryo of man and that of an embryo fish; the evolution of the nervous centres begins, in both, on the same plan; so also does that of the circulating apparatus." Comparing the changes through which the embryo passes, with the history of the general life of the globe, a strong similarity in the plan is to be observed in the individual life of every one of the forms of organised beings which now people it. There has been a succession from invertebrate to vertebrate; from the fish to the reptile, from the reptile to the bird and mammal; in the mammal finally to man. Having brought forward examples and proofs from this part of the argument, the following hypothesis is put forth. That a chemico-electric operation, by which germinal vesicles were produced, was the first phenomenon in organic creation, and that the second was an advance of these through a succession of higher grades, and a variety of modifications, in accordance with laws of the same absolute nature as those by which the Almighty rules the physical department of nature. The theory of development was strongly and ably opposed by Mr Hugh Miller, Professor Sedgwick, Dr Hitchcock, and others, who argued that it was immoral and anti-Christian to doubt the generally received theory of creation by law; namely, that every event in nature takes place by fixed and not by progressive law. Notwithstanding the strong opposition the theory has received, it has gained many supporters. Since the year 1859, when Mr Darwin published his "Origin of Species by Natural Selection," the subject has excited much attention. In this work Mr Darwin brings forward an hypothesis of the *becoming* of new species, founded on the modifiability of which animals are seen to be capable under breeding. The principal suggestion in the work is, that in the struggle for existence among the multitudes of animals, any variety which was better adapted for the circumstances than its companions, would live and increase while the others declined. He thus traces all animals back to four or five primitive types, rejecting the theory of development, and referring all the phenomena to an advance or improvement in progress.—Besides the works referred to, see *Explanations, a Sequel to Vestiges*, &c.; and *Edinburgh Review*, April, 1860, art. Darwin on the Origin of Species.

DHOLE, *dhol'-le*, a native dog of India, (*Cuon Dukhuensis,*) whose origin is uncertain. It is found only on the western frontiers of British India, and is very shy, so that many residents have never seen it wild. It hunts in packs, and runs down almost every animal except the elephant and rhinoceros. Its colour is rich bay. It is sometimes called the Kholsun.

DIAMOND-BEETLE, a name usually given to *Entimus imperialis*, a species of the tribe Curculionidæ, (weevils,) and order Coleoptera, found abundantly in Brazil. It is polished black in colour, the head, thorax, and limbs being slightly granulated and covered with metallic green scales, and the wing-cases (*elytra*) studded with regular lines of concavities, each depression thickly lined with bright green scales, so that the rays of light are reflected and heightened by the contrast of the shining black interstices. The genus Entimus is entirely exotic; but there are small species of the genera Polydrosus and Phyllobius common in England, ornamented with similar scales, but not presenting the gem-like spots. The elytra of the diamond-beetle are sometimes made into head-dresses, &c., for ladies; but the most general use of the insect is as an object for the microscope.

DIAMOND-BIRD, (*Pardalotus punctatus,*) a pretty little Australian bird, belonging to the Chatterers. It is one of the burrowers, driving its tunnel far into the banks, and making at the extremity a globular nest, with an opening in the side. It derives its name from the pure white spots which decorate the black plumage of the head, wings, and tail.

DIANA MONKEY, a pretty little African monkey, belonging to the genus Cercopithecus, and remarkable for a long and sharply-pointed beard, and a white crescent on the forehead.

DIAPHRAGM, *di'-ă-fram*, (Gr. *diaphragma*, a partition,) in Anat., is the name given to that transverse muscle which separates the thorax or chest from the abdomen or belly. It is usually described as consisting of two muscles. The superior and larger of these arises from the ensiform cartilage of the sternum, and the ends of the lower ribs on each side; from which points the fibres converge, and terminate in a tendon, or aponeurosis, termed the *centrum tendinosum*, or central tendon. The second and inferior muscle springs from the vertebræ of the loins by two productions, or crura; that on the right side from the four upper lumbar vertebræ, that on the left from the three upper ones. From these points the fibres ascend, some of them crossing over and decussating to surround the œsophageal opening; but all of them ultimately uniting with the central tendon, and thus making but one muscular partition. The diaphragm is convex superiorly and concave inferiorly, and is covered on its upper side by the pleura, and on the lower by the peritoneum. In form it is nearly circular, and is fleshy at the edges, but becomes tendinous towards the centre. It presents three large openings and several smaller ones. The opening of the vena cava is quadrangular in form, and is situated in the tendinous centre. The œsophageal opening is posterior to that of the vena cava, and is of an elliptic form. The aortic opening is the most posterior, triangular, and between the crura. This muscle is the principal agent in respiration; for by contracting it enlarges the cavity of the chest, and allows the lungs to receive the air in respiration, while by being relaxed, the cavity of the chest is again diminished, and the air suddenly expelled. The contracting and relaxing of this muscle must likewise, it is evident, have a similar effect in increasing and diminishing the size of the abdominal cavity; and hence, by its action upon the stomach and intestines, it aids in the expulsion of the fæces and urine. The diaphragm is largely engaged in laughing, sneezing, sighing, sobbing, and other affections of the respiratory organs. Whatever occasions stoppage of the action of this muscle speedily proves fatal. It is subject to inflammation, called *diaphragmatitis;* but as this is rarely confined to the organ itself, but communicated either to the pleura or peritoneum, its symptoms and mode of treatment correspond with inflammation of these parts. (*See* PERITONEUM.)

DICÆUM, *dy-see'-um*, a genus of birds allied to the Sun-bird, and belonging to the family Promeropidæ. They are all very small, and are generally brightly coloured. Their voices are strong, and they usually remain at the summits of the highest trees. Some of them make beautiful pensile nests.

DICOTYLE. (*See* PECCARY.)

DICRURUS. (*See* KING CROW.)

DIDUNCULUS, *die-dun'-cul-us*, a genus of birds allied to the pigeons, and the nearest living relatives of the extinct dodo. It is sometimes called the Tooth-billed pigeon. It inhabits the Samoan Islands, and is very rare.

DIDELPHYS. (*See* OPOSSUM.)

DIDUS. (*See* DODO.)

DIGITIGRADA, *dij'-jit-e-grai'-dă*, (Lat. *digitus*, a finger; *gradior*, I walk,) in Cuvier's zoological system, a tribe of carnivorous animals distinguished by walking upon the toes, the heel being always raised from the ground. Those animals which place the heel or the sole of the foot on the ground belong to the tribe Plantigrada. Some of the most carnivorous mammalia belong to the Digitigrada. The feline and canine families, hyænas, civets, &c., are all included in it. The Weasel family (*Mustelidæ*) appears to form a connecting link between the Digitigrada and the Plantigrada.

DINGO, *ding'-go*, (*Canis Dingo,*) the native dog of Australia, regarded by some naturalists as a distinct species, but more generally as the descendant of a race once domesticated, and returned to its wild state. It is found in Australia both in a wild and tamed state; the tame dingo being about the size of our familiar sheep-dog, and the wild one somewhat larger. The latter has a large head, with a fuller muzzle than the sheep-dog; ears short and erect; tail bushy; colour tawny. It does not bark, and is very destructive to the sheep of the colonists; not so much on account of the amount of meat required for the satisfaction of its hunger, as from its savage habit of continuing to strangle as many sheep as its strength will allow before it squats down to pick a bit of one.

DINORNIS, *di-nor'-nis*, (Gr. *deinos*, wonderful or terrible; *ornis*, a bird,) a genus of large birds of the tribe Brevipennes. No species of the dinornis now exists, but many bones belonging to birds of this class have been found in New Zealand, not only in the most recent deposits, but in the sand by the sea-shore, in caves, in swamps, in the soil of forests and in river-beds. Among the natives there are many traditional reports about these birds, which were called *moa*. Other large birds, such as the palapteryx and the aptornis, are also spoken of by them. It would appear that the dinornis became extinct at the end of the seventeenth or the beginning of the eighteenth century. According to the traditions of the natives, these birds must have had brilliantly coloured plumage, and their flesh was a delicate food. For these two reasons they were objects of pursuit. They are described also as being fat and stupid, unable to fly, and living in the mountains or in the depths of forests, feeding entirely on vegetable food. The bones of the dinornis have been closely examined by comparative anatomists, and the description of the natives coincides with the inferences drawn. The dinornis must have been considerably larger than any bird now existing; some of the bones found are twice as large as those of the ostrich. The body must have been very bulky, and somewhat similar to that of the extinct dodo. The *Dinornis giganteus* must have been nearly eleven feet high. The bones of the legs are massive, and remarkably solid in structure. The number of bones of the dinornis that have been found is very great. Several species have been recognised, and some skeletons have been nearly completely restored. The first bone examined by a naturalist was a leg-bone, and the naturalist was Professor Owen. From that bone alone he placed the dinornis in its correct place in the system of nature.

DINOSAURIA, *di-no-saw'-re-ă*, (Gr. *deinos*, wonderful or terrible; *sauros*, a lizard,) a term applied to distinguish an order of extinct lizards found as fossils in the Lias, Oolite, and Wealden formations. There are, however, no traces of them in the Lower Cretaceous strata. The Dinosauria were enormous reptiles of the lizard class, which approached nearer to the mammal type than any other of their order. Four powerful limbs supported their bodies, and the sacrum was composed of five vertebræ amalgamated. The Megalosaurus, the Iguanodon, and the Hylæosaurus are the principal genera of the order.

DINOTHERIUM, *di-no-the'-re-um*, (Gr. *deinos*, wonderful or terrible; *therion*, a wild beast;) an extinct animal, whose cranial bones are found in the Miocene formations of Germany, France, &c. Like the elephant, this remarkable animal was provided with a pair of formidable tusks, which projected downwards from the lower jaw. It was also provided on each side of its jaws with five double-ridged grinders. From the largeness of the nasal cavity, it is supposed that the animal had a trunk like the elephant. As none of the body or limb bones of the dinotherium have been found, its true position in the system of nature is not accurately determined. Cuvier and Kamp have referred it to the same class with the tapir.

DIOMEDEA. (*See* ALBATROSS.)

DIODON, *di'-o-don*, (Gr. *dis*, twice; *odous*, tooth,) a Linnæan genus of fishes, now giving its name to a family—Diodontidæ. These fishes are about two feet in length, of a nearly spherical form, and possess the power of inflating or contracting themselves at pleasure. When their stomachs are thus distended with air, there are displayed over the entire surface numerous spines, as though to protect its now somewhat unwieldy body from attack. It is doubtless this latter circumstance that has procured for the fish the titles of Sea-porcupine and Globe-fish. When inflated, the globe-fish is incapable of swimming, but floats with the stream. They are found in warm seas.

DIPPER, (*Hydrobates cinclus*,) a small bird, allied to the thrush, which lives near streams, and is an admirable diver, procuring its food from the bed of the river. It builds a nest of moss like that of the wren, and generally places it under a sheltered bank close to the water.

DIOPSIS, *di-op'-sis*, a genus of dipterous insects, remarkable for the length of the pedicles or footstalks on which the eyes are situated. On this account it is likewise termed the Telescope-fly. All the species are found in warm parts of the Old world.

DIPLOGLOSSUS, *dip-lo-glos'-sus*, a genus of lizards belonging to the family of the Skinks, and found in tropical America. Their head and tail are cylindrical and elongated. They are active little creatures, and are found in places where the soil is moist, and the air cool.

DIPSADIDÆ, *dip-sa'-di-dee*, a family of colubrine snakes, having a slender and compressed body, and a short head, with the shields blunt. They are found in South America and the East Indian Islands. The ancients believed that these snakes used to lie at the bottom of wells and poison the water, and that its bite caused the sufferer to die of thirst.

DIPTERA, *dip'-ter-ă*, (Gr. *dipteros*, two winged,) an order of insects, having for their most conspicuous character only two wings, corresponding to the anterior pair of four-winged insects. They are also distinguished by having two clubbed appendages, called *halteres* or balancers, which are the rudiments of two posterior wings. In ordinary language the Diptera are called flies, usually with some characteristic prefix; such as the house-fly, blow-fly, &c. The term fly, however, is often applied to insects which do not belong to the Diptera; as butter-fly, dragon-fly, May-fly, &c. Mosquitoes, gnats, and midges belong to the Diptera. It is one of the most extensive of the orders of insects, and some of the species are remarkable for the extraordinary numbers in which they appear. The larvæ of the order have frequently a membranous head, and always have the stigmata, or breathing-pores, confined to the second and terminal segments of the body. Dipterous insects are also distinguished by having the mouth in the form of a sucker, composed of from two to six lancet-shaped elongated scales, enclosing a canal upon the upper surface of the tongue or proboscis.

DIPUS. (*See* GERBOA.)

DISCOPHORA, *dis-kof'-or-a*, an order of Acalephæ, having a disc-shaped body, capable of expansion and contraction, by which the creature proceeds through the water. The Medusæ, Sarsiæ, and other similar beings belong to this order.

DISTRIBUTION OF ANIMALS.—Certain tribes, genera, and species of animals are peculiar to certain portions of the globe. In some respects the distribution of animals resembles that of plants, and both these are dependent on meteorology. Thus, where vegetation is most abundant, animal life is most prolific. Plants are stimulated in their growth by heat and moisture; and as in tropical climates the heat and moisture are greatest, there also the animal formations are most abundant. As they decrease in a direction from the equator to the poles in perhaps a similar proportion, so do animals decrease, not only in the size of individuals, but in the number of species. This law affects vertebrate and invertebrate animals which inhabit the land, but is reversed in the case of those animals of higher organisation which inhabit the sea. The latter are found to increase in a direction from the equator to the poles. The distribution of animals is also limited in many cases by the intervention of seas or lofty ranges of mountains; but animals, like plants, are adapted to particular climatic conditions, and, like them, are subject to fixed laws. Man can endure the scorching heat of the tropic zone and the intense cold of the Arctic circle. The dog, however, is the only vertebrate animal that can accompany him. Many animals cannot exist except in a determined climate. The lion and tiger would soon die in an arctic climate, and a polar bear could not exist at the tropics. In continents, animal and vegetable life decrease in proportion as the observer recedes from the coast. Certain species of animals remain shut up in a chain of mountains, and are unable to move to other similar localities; for, as the temperature decreases with the elevation, before they could pass to another mountain-ridge they would have to traverse a region whose temperature would be much higher than that to which they are accustomed. The Himalayan Mountains thus present to the ascending traveller a succession of species similar to that met with in travelling from Brazil to Labrador, or from India to Kamtschatka.—*Ref.* Johnson's *Physical Atlas*.

DIVERS, *di'-verz*, (*Mergus.*) — The divers closely resemble the grebes; indeed, the chief point of difference consists in the former having palmated feet. They have a strong, straight, rather compressed, pointed bill, about as long as the head; a short rounded tail; short wings; their legs placed far back, and toes completely webbed. They fly well, and, as divers, are remarkably expert. They measure usually from two and a half feet to three feet in length, and are essentially inhabitants of high northern latitudes, visiting our shores in the autumn, remaining through the winter, and quitting us in the spring to seek their northern breeding-stations. The Great Northern diver (*Colymbus glacialis*) is the largest of the tribe. It measures full three feet in length, and four feet six inches in breadth. The bill, which is black and very strong, measures four inches from the top to the corners of the mouth. The head and neck are black, shaded with purple and green. At the back of the neck there is a white crescent-shaped band, marked with black oblong strokes pointing downwards. The breast and underside of the body are white; the back, wing-coverts, and scapulars, are black, thickly dotted with white. Speaking of this bird, Dr Richardson says: "It can swim with great swiftness, and to a very considerable distance, under water; and when it comes to the surface, it seldom exposes more than the neck. It takes wing with difficulty, flies heavily, though swiftly, and frequently in a circle round those who intrude on its haunts. Its loud and very melancholy cry, like the howling of the wolf, and at times like the distant screams of a man in distress, is said to portend rain. Its flesh is dark, tough, and unpalatable." The Red-throated diver (*Colymbus septentrionalis*) is smaller than the Great Northern, and lighter coloured. In habits, however, they exactly agree.

DODO, *do'-do*, a bird said to be now extinct, but of whose existence within the last three centuries there is abundant evidence. When, in 1598, the island of Mauritius was discovered, the bird in question was so plentiful that the sailors ate the flesh to satiety, as it was easily killed, and its flesh, especially the breast, much relished. It is described as being considerably larger than a swan, weighing sometimes fifty pounds, with a very bulky and heavy form. The bill was long and strong, depressed at the base, with a separate and much-arched apical portion, which was so sharp and strongly hooked at the tip that the dodo has been considered by some naturalists as approaching the predacious birds. The nostrils were placed on the sides of the depressed portion of the bill, which was covered by a naked skin; the face was similarly clothed. The feet, which were very short and stout, bore a considerable resemblance to those of the pigeon. The wings were also very short, and quite incapable of raising the bird in the air, even had they been furnished with the ordinary stiff quill-feathers; but, in place of these, they bore a few soft decomposed plumes like those of the ostrich and the teal, and were adorned with a tuft of similar but smaller feathers. This rudimentary condition of the wings led to the dodo's being placed among the cursorial birds by many writers. The general colour of the dodo was a blackish-gray, but the plumes of the wings were of a light ash-colour. In Tradescant's catalogue ("Musæum Tradescantianum; or a Collection of Rarities preserved at South Lambeth," by John Tradescant; London, 1656,) we find, among the "whole birds, dodao, from the island Mauritius; is not able to flie, being so big." That this was a dodo there can be no doubt; for we have the testimony of an eye-witness, whose ornithological competency cannot be doubted, in the affirmative. Willughby, at the end of his section on the dodo, and immediately beneath his translation of Bontius, has the following words:—"We have seen this bird dried, or its skin stuffed, in Tradescant's cabinet." Le Strange, in his observations on Sir Thomas Browne's "Vulgar Errors," speaks of a dodo exhibited (probably in a caravan) in the streets of London:—"About 1638, as I walked London streets, I saw the picture of a strange fowl hong out upon a cloth, and went in to see it. It was kept in a chamber, and was a great fowle, somewhat bigger than the largest turkey-cock, and so legged and footed, but stouter and thicker, and of a more erect shape; coloured before like the breast of a young cock tesan, (pheasant,) and on the backe of dunn or deare colour. The keeper called it a dodo, and in the ende of a chimney in the chamber there lay an heap of large pebble-stones, whereof he gave it many in our sight, some as bigg as nutmegs; and the keeper told us shee eats them, conducing to digestion; and though I remember not how farre the keeper was questioned therein, yet I am confident that afterwards she cast them all agayne." Tradescant's stuffed specimen passed to the Ashmolean Museum at Oxford; but, being allowed to fall to decay, it was, by order of the curators, destroyed in 1755. Luckily, however, the head and one of the feet escaped destruction, and these, together with one other foot, safely stored in the British Museum, comprise the sole known remains of a creature commonly eaten within the last three hundred years.

DOG, *dog*, (*Canis familiaris.*)—To use the oft-quoted words of a great naturalist, "The dog exhibits the most singular, the most complete, and the most useful conquest that man has made. The whole species is become our property; each individual is entirely devoted to his master, adopts his manners, distinguishes and defends his property, and remains attached to him even unto death; and all this springs not from necessity—not from restraint, but simply from gratitude and a true friendship."—(*Cuvier.*) In all ages the *origin* of the domestic dog has been a question, and one most difficult of solution, with the most learned naturalists. Some are of opinion that the breed is derived from the wolf; others maintain that it is a familiarised jackal; all agree that no trace of it is to be found in a primitive state of nature. Wild dogs still exist: India furnishes them. There thousands exist in a completely independent state, and without exhibiting any wish to share the dwellings of man. Close observation of these animals, however, throws little light on the subject; and after all it would appear that they are naught else than abandoned canine vagabonds; and in their prowlings about the skirts of the villages they exhibit a fearlessness of human beings that, since it does not spring from ferocity or defiance, would seem to betoken a confidence in man never to be found in the roaming wolf or jackal. In certain Eastern cities, again, the canine prowlers are very numerous, and sometimes dangerous to approach, on account of their ferocity. This, however, is small proof of their wolfish origin. As Colonel Hamilton Smith truly observes, "If domestic dogs were merely wolves modified by the influence of man's wants, surely the cur of Mohammedan states, refused domestic care, and only tolerated in the capacity of scavengers, would long since have resumed some of the characters of the wolf." Mr Bell, whose opinion of the subject is of high value, says: "In order to come to any rational conclusion on this head, it will be necessary to ascertain to what type the animal approaches most nearly after having for many successive generations existed in a wild state, removed from the influence of domestication and of association with mankind. Now we find that there are several distinct instances of the existence of dogs in such a state of wildness as to have lost even that common character of domestication,—variety of colour and marking. Of these, two very remarkable ones are the dhole of India and the dingo of Australia; there is, besides, a half-reclaimed race among the Indians of North America, and another, also partially tamed, in South America, which deserve attention; and it is found that these races, in different degrees, and in a greater degree as they are more wild, exhibit the lank and gaunt form, the length of limb, the long and slender muzzle, and the great comparative strength which characterise the wolf; and that the tail of the Australian dog, which may be considered as the most remote from a state of domestication, assumes the slight bushy form of that animal. We have here, then, a considerable approximation to a well-known wild animal of the same genus in races which, though doubtless descended from domestic ancestors, have gradually assumed the wild condition; and it is worthy of especial remark that the anatomy of the wolf, and its osteology in particular, does not differ from that of the dog in general more than the different kind of dogs do from each other. The cranium is absolutely similar, and so are all, or nearly all, the other essential parts; and to strengthen still further the probability of their identity, the dog and the wolf will readily breed together, and their progeny is fertile. The obliquity of the position of the eyes in the wolf is one of the characters in which it differs from the dog; and although it is very desirable not to rest too much on the effects of habits or structure, it is not, perhaps, straining the point to attribute the forward direction of the eyes in the dogs to the constant habit for many successive generations of looking forward to their master, and obeying his voice." The latter part of this argument is, however, of too theoretic and speculative a character to carry weight, or, as some insist, to be worth weighing. With regard to the alleged untamably savage disposition of the wolf, Mr Bell disposes of the objection by relating two anecdotes, one of which is of a she-wolf confined in the gardens of the Zoological Society in the Regent's Park. This creature, who had pups, was constantly in the habit of bringing them to the bars of her den that they might be caressed by the visitors, till at length, through constant friction against the hard iron, she rubbed the life out of the whole of her precious litter. Another strong argument used by Mr Bell in favour of the identity of the dog and the wolf, is the fact that in both the period of gestation is the same,—sixty-three days. The young of both wolf and dog are born blind, and see at the same, or about the same time, namely, at the expiration of the tenth or twelfth day. A satisfactory classification of the different kinds of dog has not yet been arrived at. What some naturalists regard as types, others regard as mere mongrel races. It is hard to found a principle of arrangement; form does not afford it, neither does the character of the fur; kinds that are totally dissimilar associate as easily as those that are closely allied. One of the best arrangements is that made by Colonel Hamilton Smith, wherein the domestic dogs are grouped in six sections:—1. The Wolf-dogs, including the Siberian, Iceland, Esquimaux, Newfoundland, Nootka, sheep, great wolf, Great St Bernard, Pomeranian dog, &c.; 2. Watch and Cattle dogs, including the German boar-hound, Danish dog, mâtin, dog of the North American Indians, &c.; 3. the Greyhounds, including the Brinjaree dog, different kinds of greyhound, Irish hound, lurcher, Egyptian street dog, &c.; 4. the Hounds, including the bloodhound, old Southern hound, staghound, foxhound; harrier beagle, pointer, setter, spaniel, springer, cocker, Blenheim dog, water-dog, or poodle, &c.; 5. the Cur dogs, including the terrier and its allies; 6. the Mastiffs, including the different kinds of mastiffs, bull-dog, pug-dog, &c.

DOG-FISH, (*Scylbidæ*,) the common name of some of the smaller species of shark. The Little Dog (*Scyllium caniculum*) and the Rock

Dog (*Scyllium catulus*) are very plentiful on our coasts, and are known by various names. The former species is called the Morgay and Robin Huss, and the latter is known by the titles of Spotted Dog and Bounce. There are other fishes also called Dog-fish, which belong to the true sharks, (*Squalidæ*,) and of these the best known is the Picked dog-fish, (*Acanthias vulgaris*,) which is found in the European seas, and attains a length of about three feet. One characteristic is the presence of a spine before the two dorsal fins. The body is long and tapering; the head flat; the snout conical; the teeth in both jaws sharp-edged, and formed for cutting. The tail fin is longer than it is broad. The upper parts are slate-gray, the under parts yellowish-white. To use its spines offensively, the dog-fish bends itself into the form of a bow, and by a sudden motion causes them to spring asunder in an opposite direction. It sometimes appears in prodigious numbers: twenty thousand have been taken in a net at one time off the coast of Cornwall. They are said to afford the best food of any of the sharks, and are commonly brought to the markets of sea-side towns. The flesh is often dried. The liver yields oil, and the refuse parts are used as manure. It causes great annoyance to fishermen by cutting the hooks from their fishing-lines. The skin of the various dog-fishes is used for many purposes by joiners, sword-makers, and other workmen.

Dolabella, *dŏl-la-bel'-la*, a genus of opisthobranchiate molluscs, belonging to the family of Aplysidæ or Sea-hares. The shell is nearly flat and hatchet-shaped. It is found only in hot seas.

Dolichonyx. (*See* Bob-o-link.)

Dolichotis. (*See* Mara.)

Dolium, *doh'-li-um*, a genus of univalve molluscs, popularly called Tun-shells, and belonging to the great family of the Whelks. They all inhabit the warmer seas.

Dollar Bird, a popular name for the Australian roller, because it has under each wing a white spot about the size and shape of a dollar.

Dolphin, *dol'-fin*, (*Delphinus*.)—This animal belongs to the Cetacea, and bears a great resemblance to the porpoise, but has a much longer and sharper snout. The teeth in both jaws are nearly conical, though some of the species lose those of the upper jaw at an early age. They are very voracious, and are said to prey not only on fishes, medusæ, &c., but also on the wounded and feeble of their own species. They live, however, in herds, which often delight the voyager in the ocean solitude by the gambols which they perform around his ship. "They may be discovered," says a celebrated naturalist, "at a great distance, as they are continually leaping from the surface of the sea, an action which, as it seems to have no obvious object, is probably the mere exuberance of animal mirth. When a shoal is seen thus frolicking at the distance of a mile or two, in a few moments, having caught sight of the ship, down they come trooping with the velocity of the wind. When arrived, they display their agility in a thousand graceful motions,—now leaping with curved bodies many feet in the air, then darting through a wave with incredible velocity, leaving a slender wake of whitening foam under the water; now the thin back fin only is exposed, cutting the surface like a knife; then the broad and muscular tail is elevated as the animal plunges perpendicularly down into the depth, or dives beneath the keel to explore the opposite side." It is said that in these gambols the dolphin has been known to leap out of the water to such a height as to fall on the deck of a ship.

Dorado, *do-rah'-do*. (*See* Coryphene.)

Doris, *dor'-is*, a genus of naked marine mollusca, sometimes known as Sea-lemons. The body is oval, the abdomen flat; the back flat in some, and elevated in others; the mouth has a small proboscis, with two small tentacula; the vent is situated in the back, and surrounded by a circle of branched or plumed gills. As is obvious from the structure of the digestive organs, the species must exist on the softest food. They are plentiful on the coasts of Britain, where they may be found crawling on rocks, sea-weed, &c.

Dormouse, *dor'-mous*, (from Lat. *dormio*, I sleep, and *mouse*,) a genus of rodent quadrupeds, which is generally regarded as forming a connecting link between the Muridæ (rats, mice, &c.) and the Sciuridæ (squirrels, &c.) The chief characters by which the dormice are distinguished from the squirrels are derived from the structure of the skull, teeth, and intestine. The form of the skull resembles that of the mice, in being suddenly narrowed in the frontal region. There are four molar teeth on each side in each jaw; the upper jaw not possessing the anterior rudimentary fifth molar characteristic of the squirrels. The intestine is destitute of a cœcum,—an organ which is of very large size in all the other rodentia. The dormice have no cheek-pouches. The ears resemble those of mice. The body is about the size of that of the common mouse, but much plumper; the eyes large, black, and prominent; the tail between two and three inches in length, and more hairy at the top than elsewhere. With the exception of the throat, which is white, the dormouse is of a tawny-red colour. They are found only in the temperate parts of the Old World, especially in Europe and Africa. In Asia they appear to be confined to the neighbourhood of the Caucasus. Only a single species, the common dormouse, (*Myoxus avellanarius*,) is found in Britain. It is extremely gentle and easily tamed, and feeds on beech-mast, acorns, hazel-nuts, &c. "It takes its food holding it in its hands, and sitting on its haunches like a squirrel, (so do the rats,) and often suspending itself by its hind feet, in which position it feeds as easily and comfortably as in the most ordinary position. Towards the winter it becomes exceedingly fat, and, having laid up a store of food, retires to its little nest, and coiling itself up into a ball, with the tail over the head and back, becomes completely torpid. A mild day calls it into transient life; it then takes a fresh supply of food, and relaxes into its former slumber; and, finally awakening in the spring, by which time it has lost much of its fat, it enters upon its usual habits, and the enjoyment of the conjugal and paternal affections. The young are generally born blind; but in a few days the eyes are opened, and in a short time they are enabled to seek their food independently of their parent's care. I have reason to believe, in some cases at least, the dormouse has a second brood early in the autumn, as I have received from one locality in the month of September an adult one about half grown, evidently of the spring brood, and three very young ones, not more than a fortnight or three weeks old."—(Bell's *British Quadrupeds.*) There are two others beside the common dormouse; viz., the fat dormouse (*Myoxus Glis*) and the garden dormouse, (*Myoxus Nitela.*) The former is a large species, as big as a rat, and with a tail like a squirrel. It is a native of France and the south of Europe. The garden dormouse is smaller than the fat dormouse, and, breeding in gardens, is very destructive to wall and other fruit. It is a native of the temperate parts of Europe and Asia.

DORSAL, *dor'-săl*, (Lat. *dorsalis*, from *dorsum*, the back,) denotes something appertaining to the back, and in Anat. it forms part of the name of ligaments, arteries, &c., belonging to that region.

DORSE, *dors*, a useful fish, (*Morrhua callarias*,) allied to the cod, and caught in British waters.

DORY, or JOHN DORY, *dor'-e*, a native of the Mediterranean, Northern, and Atlantic seas. Torbay, on the southern British coast, is a celebrated locality for this fish. Its name John Dory is probably derived from its French appellation, *jaune*, (yellow,) *dorée*, (gilt.) It is usually about eighteen inches in length, though Pennant mentions one that weighed twelve pounds. The general surface of the body is smooth and destitute of scales, but spiny scales or bony shields guard the dorsal and ventral edges. The anterior portions of the dorsal and oval fins are spiny, and very distinctly separated from the spineless portions. It is an extremely voracious fish, preying on small fishes and their spawn, as well as on the various kinds of crustacea and marine insects. It has an oval black spot on each side, and on this account shares with the haddock the honourable repute of being the fish from whose mouth the tribute-money was taken by St Peter, the impression of whose thumb and forefinger remained to record the event. Other species of the dory very similar to the European are found in the seas of other parts of the world. It is the type of the family Zeïdæ. The scientific name of the British species is *Zeus Faber*.

DOTTEREL, *dot'-tur-el*, (*Charadrius morielllus*,) a species of plover inhabiting the northern parts of Europe and Asia. They delight in the high elevations. On the Helvellyn, in Cumberland, 3055 feet above the level of the sea, they abound in vast numbers, as they do, likewise, on some of the highest mountains of Scotland. They are migratory, and appear in Britain on their northern migration, in spring, and on their southern migration, in the autumn. The length of the dotterel is about ten inches. Its plumage in summer is brown on the upper part; the cheeks, throat, and a band above the eyes, white; breast rusty red, with a white gorget on the upper part of it; a conspicuous black patch on the middle of the belly, and a few of the tail-feathers tipped with white. It is tolerably well known in the London market, and its flesh is much esteemed.

DOUROUCOULI, *doo-roo-coo'-lee*, (*Nyctipithecus trivirgatus*,) a pretty little monkey of Guiana and Brazil, that seldom if ever goes abroad by day, and feeds only by night. It may easily be known by the very large eyes, and the three black divergent stripes on the face.

DOVE, *duv*, (Sax. *daua*, Du. *duif*,) a name sometimes extended, as the name pigeon also is, to the whole family of Columbidæ. "No distinction between the terms Dove and Pigeon is sanctioned either by constant scientific or general popular use. Audubon attempts to make a distinction, giving the name Pigeon to those species of which many nests are built close together on the same trees, and Dove to those which are solitary in their nidification; but this distinction is quite unsuitable to the European species and contrary to British usage." (*See* PIGEON.)

DOVE GROUND. (*See* CINCLOSOMA.)

DRACO. (*See* DRAGON.)

DRAGON, *drăg'-on*, (Gr. *drakon*. Fr. *dragon*,) a term applied in modern Nat. Hist. to certain kinds of saurian reptiles. Some of these (the genus *Draco* of Linnæus) are furnished with a broad membranous lobe on each side. This is supported by the six first false ribs, which are extended straight outwards from the vertebral column. By the movement of these bones, the reptile is enabled to stretch its broad lateral membrane, which thus forms a sort of parachute, to support it in its long leaps from branch to branch. They, however, are quite destitute of any power to strike the air; so that their flight is nothing but a floating through the air. As a rule, the species is harmless; there is, however, one, inhabiting the marshy plains of Guiana, and called the Flying dragon, that bites severely if it should be handled. This creature has a long compressed tail, the back and tail crested, and the tongue forked, like that of a serpent; it sometimes attains a length of six feet. Both its flesh and eggs are eaten.

DRAGONET, (*Callionymus*,) a fish of the Gobidæ family inhabiting the Mediterranean and Northern seas. They are remarkable for having the gill-opening reduced to a small hole on each side of the neck, and the ventral fins placed under the throat, separate and larger than the pectorals. The eyes are placed on the top of the head, looking upwards; the skin smooth and scaleless. The colours of the fish are yellow, blue, and white, making a beautiful appearance. There are three or four species; but that known with us as the gemmeous dragonet, (*Callionymus*,) and, by the Scotch, *gowdie*, is by far the most beautiful. All the species are about twelve inches long.

DRAGON-FLY, (*Libellula*,) a Linnæan genus of neuropterous insects, common in England, and to be seen in fine summer weather hawking about over the surface of ponds and rivers in search of insect prey. Their vulgar English name is "horse-stinger," which is no less inappropriate than ugly, as the insect possesses no means of annoying either horses or any other of the larger animals. They rival the butterflies in their hues, and, like them, love to bask in the sunshine. They are, however, not nearly so harmless in their mode of living, and, instead of the nectar of flowers, prey on insects. They have strong horny mandibles and maxillæ, covered by the labrum and labium; their tarsi are three-pointed; their wings are equal; the posterior extremity of the abdomen is furnished with hooks or peculiar appendages. Their ferocity is so ungovernable, that when taken and imprisoned, they have been known to devour their own bodies. The great dragon-fly (*Æshna grandis*) is about four inches long, and the largest of the British species. It has been seen to dart upon a large cabbage butterfly, and to bite off the wings and devour the entire body in less than a minute. In the larva state, the Libellulidæ live entirely in the water, engaged in unceasing strife with other insects, for whose capture and destruction it possesses ample means, through a singular contrivance of its lower lip. This consists of two principal pieces, one of which is articulated to the head, whilst the second is attached to its extremity. At the apex of this second piece, two jaw-like organs are articulated. In repose this lip is folded beneath the head, but can be immediately extended to a considerable distance in front of the head, so as to seize any minute insects or small fishes that may pass before it. The respiration of the larvæ of some of these insects is singularly contrived. They are provided with the means of drawing water into their bodies to supply air for respiration, and expel it again by the same orifice at the extremity of the abdomen, with such force, that they thus propel themselves through the water, whilst their legs are at rest. The hooks at the extremity of the abdomen of the dragonfly render the creature essential service at the period of transformation. Crawling out of the water, it attaches itself by these hooks to a stick or rush, and struggles out of the pupa-case. At first its body is quite soft and moist, and the wings folded up into a small compass. In a few hours, however, the wings are capable of expansion, and the body assumes a proper consistency. Dragon-flies abound most in warm climates, but are met with in very northern regions.

Drassidæ, *dras'-sĭd-ee*, a family of spiders having three pairs of spinnerets, and the tarsi with two claws and many papillæ, or three claws and no papillæ. They form a very large family, and are spread over the greater part of the globe.

Drepanis, *drep'-an-is*, a genus of birds belonging to the family Promeropidæ, and inhabiting the Sandwich Islands. The brilliant feathers of the scarlet drepanis are used by the natives in the manufacture of feather-mantles, helmets, &c.

Drill, *drill*, (*Papio leucophæus*,) a baboon inhabiting the coast of Guinea, and bearing some resemblance to a young mandril, *q. v.*

Driver-Ant, *dri'-vur*, the local name of a species of hymenopterous insects belonging to the family of Ants.

Dromaius. (*See* Emu.)

Dromedary. (*See* Camel.)

Dromia, *dro'-me-ă*, a genus of crustacea, of which the sponge-crab (*Dromia vulgaris*) may be taken as the type. The sponge-crab is furnished with two sharp curved claws, which enable it to hold fast to pieces of sponge, medusæ, &c.

Drone. (*See* Bee.)

Drone-fly. (*See* Eristalis.)

Drummer, a species of cockroach found in the West Indies, and so named from its habit of keeping up a continual knocking noise during the night. They are said to attack people when asleep; and this is probably correct, since they have been seen to prey on the extremities of the dead. (*See* Blattidæ.)

Dubb. (*See* Bear, Syrian.)

Duck, *duk*, (Ang.-Sax.; Lat. *anas*.)—The group to which the name of duck is generally extended is characterised by greater breadth of bill than either the swans or geese. Their food is chiefly animal, whilst that of both swans and geese is in great part vegetable. A well-known example of this family is the wild duck, or common mallard, (*Anas Boschas*,) the original of all the ordinary domestic varieties. It is found in all the countries of Europe, but abounds especially in the northern parts. It is nearly two feet in length, three feet in extent of wings, and weighs about three pounds. The bill is of a greenish-yellow colour; the head and upper part of the neck of a glossy green, terminated in the middle of the neck by a white collar. The scapulars are white, barred with fine brown lines; the back is brown, and the rump black, shaded with green. The lower part of the neck and breast is of a chestnut-colour; the belly pale gray, barred with dusky bars. The legs are orange-yellow. Like the rest of the duck tribe, the mallards quit the north at the end of autumn, and migrating southward, arrive at the beginning of winter in large flocks, and spread themselves over the marshy wastes of Britain. In bygone times, when the tracts of marsh land in England were much more extensive than now, the mallard was among the commonest of our wildfowl; and even now our fen counties are patronised by them in such vast numbers as to keep the London market fully supplied in the season. The extreme wariness of these birds renders necessary much patience and ingenuity in obtaining large quantities of them. They fly at a considerable height in the air, in the shape of a wedge or triangle; before they alight on any spot, they take several wheels in the air, as though to reconnoitre, and then descend with extreme precaution. When at rest on the water, they take care to keep at a considerable distance from the shore, and when they compose themselves for sleep, some of the company are always awake to keep guard and to apprise the remainder of the approach of danger. They are much more active by night than by day. The wild duck usually makes her nest amongst the tall grass or rushes skirting the water; but instances have occurred of the birds building in trees. "In Sussex, the nest of a mallard was found in an oak-tree five-and-twenty feet from the ground; the old bird was sitting upon nine eggs supported on some small twigs laid crosswise. In Derbyshire a gentleman's gamekeeper observed a wild duck fly out of a large oak in which the year previous had been a hawk's nest. On examination she was found to have completely repaired the old nest and to have laid therein two eggs. Another instance occurred at Madely, in Staffordshire. In this case the wild duck took possession of a rook's nest near the top of an oak. The drake was also seen to perch on a bough near her, and occasionally in her absence to sit in the nest."—(Stanley's *History of Birds*.) The food of the duck consists of worms, mollusca, and aquatic insects, which they separate from the mud by the agency of lamellæ at the margins of the bill. In speaking of the mallard as the type of the true duck, Mr Yarrell observes, concerning their leading characteristics:—"Externally they exhibit considerable length of neck; the wings are also long, reaching to the end of the tail; the tarsi somewhat round; the hind toe free, or having no pendent lobe. In habits they may be stated generally as frequenting fresh water, but passing much of their time on land, feeding in ditches and about the shallow edges of pools, on aquatic plants, insects, worms, and occasionally fish, taking their food at or near the surface; possessing great powers of flight, but seldom diving, unless pursued. Of their internal soft parts, the stomach is in the greatest degree muscular, forming a true gizzard; the intestines long; the cœcal appendages from six to nine inches in length in the larger birds, and decreasing only in proportion to the size of the species. Of the bones it may be observed that the ribs are short, extending but little beyond the line of the posterior edge of the sternum. The keel of the breastbone is deep, affording great extent of surface for the insertion of large and powerful pectoral muscles. The enlargement at the bottom of the trachea in all of them is of bone only." In his first division of true ducks, Mr Yarrell includes the sheldrake, Muscovy duck, wild duck, gadwell, shoveller, pintail, widgeon, bimaculated duck, garganey, and teal; accounts of all of which will be found in the proper places. The domestic duck is duller of plumage and less graceful in form than the wild. The most obvious distinction between them, however, lies in the colour of their feet; those of the wild ducks being yellow, and the tame ducks black. The tame duck does not, like the wild, pair, and remain with one mate, but takes the control of an entire troop of hens. Whatever its species may be, the tame duck is a desirable bird to have in a poultry-yard. Nor is water indispensable to its existence; "so far from it, indeed, that, instead of being absolutely necessary, it is often injurious to the young; in fact, they should never be allowed to swim till more than a month old. Instead of allowing young ducks to go out in the morning to eat slugs and worms, they should be kept up, since this food, notwithstanding their partiality for it, is injurious."—(*Stanley*.) They lay a great number of eggs, require very little attention, and, with respect to ducklings, they may be easily fattened in the course of a month with any kind of pulse, or grain and water. For the various ducks, see their distinguishing epithets, such as Eider, Pintail, &c.

Duckbill, Ornithorhynchus, or **Platypus,** *duk'-bil*, a genus of mammalia, order Monotremata. Only one species is fully ascertained, (*O. paradoxus*, or *anatinus*,) generally known as the water-mole in the Australian colonies. The entire length of the animal, including bill and tail, is about two feet; body long and compressed, and thickly covered with very glossy hair, at the roots of which is a layer of waterproof, felt-like material. The head is round and small, eyes small and bright, no external ear, and instead of the muzzle, mouth, and teeth of an ordinary quadruped, the creature is furnished with a bill like that of a duck, (but broader in proportion,) and possessing small transverse laminæ like the duck's bill. This so-called bill is produced by an elongation of the nasal bones. The legs are short; the fore feet have each five toes, with strong burrowing claws and a connecting membrane for swimming. The hind feet are likewise webbed, but the web does not extend beyond the base of the claws. The tail is strong, broad, and flattened, about half as long as the body, covered with longer and coarser hairs, and nearly naked on its under surface. It lives chiefly in the water, and, like the duck, seeks its food among the mud. Its burrowing powers are said to exceed those of any other animal, fifty feet being no very uncommon length for it to run. It is wary and active, and by no means easily shot. Its voice resembles that of a young puppy.

Duct, *dukt*, (Lat. *duco*, I lead or conduct,) denotes generally any tube or canal by which a fluid is conducted or conveyed. It is more particularly used in Anat. to denote the vessels which convey the fluids in animal bodies.

Dugong, *du'-gong*, (*Halicore Dugong*,) a marine animal belonging to the herbivorous cetacea. In general form it much resembles the manatee. Its length varies from twelve to twenty feet. It feeds on the algæ which grow on submarine rocks in shallow seas. Its affection for its young is remarkable; and if the latter can be surprised and captured, the mother may be easily taken. Its flesh is eaten, and said to resemble coarse beef in texture and flavour. It is found among the islands of the Indian archipelago. Rüppell asserts that it was with the skin of the dugong that the Israelites were ordered to veil the tabernacle.

Dun-bird. (*See* Pochard.)

Dung-beetle, *dung-be'-tl*, (Ang.-Sax.,) the name of certain of the Scarabæides, living, for the most part, on or in the dung of other animals. They are scientifically known as Coprophagi, (Gr., dung-eaters.) For the most part they are black, or black and brown, and some few are adorned with brilliant metallic colours. To this section belongs the sacred beetle of the Egyptians, the *Scarabœus sacer* of Linnæus: it is about an inch long, and of a black colour. This species is not only found in Egypt, but is met with in the south of Spain, France, and Italy, and, as well as other species of the group to which it belongs, incloses its eggs in a ball of excrement, which it forms by rolling the substance by means of its hind-legs. The size of the ball, when completed, is much larger than the insect, being sometimes as much as an inch and a half in diameter. The dor, or shard-born beetle, (*Geotrupes stercorarius*,) belongs to this tribe, and is one of the commonest of British beetles. It is of a stout form; less than an inch long; black, with metallic and blue reflections on the under-surface. This species may often be heard droning through the air of a summer evening. It is almost impossible to overestimate the great good performed by these insects. Not only do they hasten the removal from the ground of what becomes more offensive the longer it stays, but they carry the offensive matter to where plants grow, and, by distributing it in the soil, materially assist their proper growth.

Dunlin, *dun'-lin*, (*Tringa cinclus*,) a bird allied to the sandpipers, and very common in our woods, where it appears in vast flocks, and feeds on the mud banks of tidal rivers. It is sometimes called Ox-bird, Stint, or Purre, according to the locality and the state of the plumage, the winter coat giving the bird the name of Purre.

Duodenum, *du-o-de'-num*, (Lat. *duodenus*, consisting of twelve,) in Anat., is the name given to the first portion of the small intestine, and was so called by the ancients because it was supposed not to exceed the breadth of twelve fingers; but as they dissected only animals, this does not hold true in the human subject. It is from eight to nine inches in length, and commences at the pyloric end of the stomach. It first inclines upwards, backwards, and to the right, and, having arrived near the neck of the gall-bladder, it bends vertically downwards, and again changes to a transverse direction; thus forming two curves or angles. It is in this intestine that chylification of the food takes place. (*See* Digestion.)

Dura Mater. (*See* Brain.)

Duyker Bok, *die'-ker-bok*, (*Cephalopus mergens*,) an elegant antelope of Southern Africa, that is mostly seen on the borders of the bush. When alarmed, it springs into the long grass, or bushes, and disappears as if it had dived into darkness. The word Duyker is Dutch, and signifies diver. Its general colour is yellowish-brown above, and white below.

Dytious, *die'-ti-kus*, a genus of water-beetles, common in ponds and streams, and notable for their feeding in the larval and perfect states. The males are remarkable for the dilatation of their joints of the tarsus, which are wide, flat, and covered with suckers. They are predacious, and will eat each other, if several be confined in one cage. They can fly and swim well, but they are awkward on land.

Dzigguetai, *dzig-ge-tâ'-e*, (*Asinus onager*,) the wild ass of Persia and India, a swift and active animal, frequenting rocky ground, and nearly as sure-footed as the chamois. Its flesh is excellent, and its chase is a favourite amusement in every land where it resides.

E

Eagle, *e'gl*, (Fr. *aigle*, Lat. *aquila*,) a genus of birds of prey, constituting the largest of the Falconidæ. In these birds the bill is of moderate length, with the ridge of the upper mandible straight from the base, at least as far as the end of the cere, beyond which it is decurved; the lip is strongly hooked and acute, but is destitute of the strong tooth characteristic of the true falcons; and the lateral margins are more or less festooned. The wings are long and usually pointed, with the third, fourth, and fifth quills longest; and the tail is long, broad, and rounded. The tarsi are rather long, but vary greatly in their clothing, being sometimes covered with scales of various forms, and sometimes completely clothed with feathers. The toes are long and powerful, the inner one being usually stronger than the outer: they are all armed with long, strong, and greatly acute claws. The finest of the British species, and perhaps the finest of the group, is the well-known golden eagle, (*Aquila chrysaëtos*.) It is a solitary bird, building its nest on ledges of rock in the wildest part of the country, and far from the habitations of man. It is very common in Sweden, in Scotland, in the Tyrol, Franconia, and Suabia; more rare in Italy and Switzerland; rather common in France, in the mountains of Anvergne, and in the Pyrenees; rare in Holland; and less common in the Oriental countries. The general colour of the plumage is deep brown, mixed with tawny on the head and neck, the feathers on the back being finely shaded with a darker hue. The wings, when closed, reach to the end of the tail; the quill-feathers are chocolate-coloured, with white shafts; the tail brown; feet yellow. It measures in length about three feet, with an expansion of wing of at least seven feet; and weighs about fourteen pounds. Its strength is prodigious. It has been seen to carry up to its lofty nest lambs of several weeks old, and even young fawns. It, however, now and then comes to harm through creatures very much smaller than those mentioned. Bishop Stanley relates that a gamekeeper out on the moors observed an eagle rise from the ground with something it had seized as its prey. For a time it sailed away steadily, but suddenly it became agitated, and, after fluttering irregularly for a short time, spired upwards in a straight line to a vast height, and then, ceasing to flap its wings, fell headlong to the ground. Struck with so unaccountable an occurrence, the keeper made what haste he could to the spot, and there found the eagle quite dead, with a wounded stoat by its side. It appeared that the eagle had seized the stoat in its search for prey, and the latter had contrived, while in the air, to open a vein or artery in the eagle's body, and to keep firm hold of the wound it had inflicted. Another case is recorded where the eagle fell suddenly and unaccountably from a great height, and, on being approached, a weasel peered out from under the great bird's wing, and scuttled off. The ring-tailed eagle is the one and two-year-old young of the golden eagle. Besides the golden eagle, there is another British species of this family, which feeds on fish, and, for this reason, is always met in the neighbourhood of water. This is the white-tailed sea-eagle, (*Haliaëtus albicilla*.) It is rather larger than the golden eagle, but exhibits a smaller extent of wing. Despite this bird's large size and strength, it rarely ventures to attack any animal larger than a hare; indeed, it seems to prefer its prey ready killed, and subsists for the greater part on stranded fish and the carrion carcases of such animals as it may find. This bird builds upon ledges of rocks that overhang the sea: the nest is composed of sticks, seaweed, and similar coarse material. The American or white-headed sea-eagle (*Haliaëtus leucocephalus*) is found in every part of the United States of America, preferring the low lands near the sea-shore to mountainous districts. It is this bird that America takes as its symbol. It is about the size of the golden eagle, but of a lighter colour, and the legs are only feathered a little way below the knees. The bill is large, acutely hooked, and of a bluish colour. A row of strong bristly feathers hangs from its lower mandible, and from this it takes its occasional name of Bearded eagle. Its chief prey is fish, and he commonly secures it as he swims near the surface of the water. It would seem, however, to derive not a little of its aliment by a stratagem much more ingenious than honest. The osprey, or hawk-fish, generally abides in the white-headed eagle's neighbourhood, and occasionally the latter, instead of fishing for himself, lurks near the osprey. This bird, sailing gently over the water, watches till a fish appears in sight, and then, to use Wilson's words, "like a perpendicular torrent, it plunges into the sea with a loud, rushing sound and with the certainty of a rifle. At this moment, the eager looks of the eagle are all ardour, and, levelling his neck for flight, he sees the fish-hawk once more emerging, struggling with its prey, and mounting in the air with screams of exultation. These are a signal for our hero, who, launching into the air, instantly gives chase; soon gains on the fish-hawk; each exerts his utmost to mount above the other. The unencumbered eagle rapidly advances, and is just on the point of reaching his opponent, when, with a sudden scream, the latter drops his fish; the eagle, poising himself for a moment, as if to take more certain aim, descends like a whirlwind, snatches it in his grasp before it reaches the water, and bears it silently away to the woods." Besides those enumerated, there are the Crowned eagle, (*Aquila coronata*,) found in Africa; the Superb eagle (*Falco superbus*) of Guinea; the Cheela eagle (*Falco Cheela*) of India; the Royal eagle (*Aquila imperialis*) of South America; the Royal eagle (*Aquila regalis*) of Africa; the Vulturine eagle (*Aquila vulturina*) of Caffraria, together with many others.

Eagle-Hawk, (*Morphnus*, or *Spizaëtus*,) a genus of Falconidæ of the Eagle group, but consisting of species of comparatively small size, and characterised by short wings, long slender legs, (tarsi,) and comparatively feeble toes and claws. They are natives of warm climates, chiefly of South America, but also of Africa and the East Indies.

Eagle-Owl, (*Bubo*,) a genus of the Owl family found in almost all parts of America. (*See* Owl.)

Ear, *eer*, (Ang.-Sax.,) in Anat. and Physiol., is the organ of hearing, and consists of three parts,—the external ear, the middle ear or tympanum, and the internal ear, or labyrinth. The external ear consists of an expanded trumpet-shaped cartilaginous structure, called the pinna or auricle, which collects the sounds, and a tube which conveys these sounds to the internal ear. The pinna or auricle consists of an uneven piece of yellow cartilage, covered with integument, and fixed to the margin of the meatus auditorius externus. It is of an oval form, with the margin folded and the larger end placed upwards. The round rim-like margin is called the helix, the depression immediately within which being the groove or fossa of the helix. Within the latter is a large elevation, called the antihelix, which presents at the upper part a well-marked depression,—the fossa of the antihelix. In the centre of the pinna is a deep hollow, named the concha, which conducts to the opening of the meatus auditorius. In front of that hollow is a projection of a triangular shape, called the tragus; and on the opposite side of the hollow, rather below the level of the tragus, is another projection—the antitragus.. Inferiorly the pinna is terminated by a soft pendulous part, called the lobule. The auditory canal, meatus auditorius externus, or the tube by which sound is conveyed from the pinna to the internal ear or tympanum, is about an inch and a quarter in length, and is formed partly by bone and partly by cartilage and membrane. Its direction is obliquely forwards and inwards, and is somewhat bent downwards towards the middle, so that it is rather higher there than at either extremity. In shape it is rather flattened from before, backwards, and it is narrowest at the bent part. The cartilaginous portion is about half an inch in length, and is formed by the cartilage of the concha and tragus being projected inwards to the circumference of the auditory passage, to which it is firmly attached. At the upper and back part of the tube the cartilage is deficient, and its place is supplied by fibrous membrane. The osseous portion is about three-quarters of an inch in length, and is narrower than the cartilaginous part. Its outer extremity is dilated and rough in the greater part of its circumference, for the attachment of the cartilage of the pinna. The inner end is less dilated than the outer, and is sloped, so that the anterior wall juts out beyond the posterior by about two lines: it is marked, excepting at its upper part, by a narrow groove, for the insertion of the membrana tympani. The skin lining the auditory canal is very thin, and closely adherent to the cartilaginous and osseous portions of the tube. It is continued over the membrane of the tympanum in the form of a thin pellicle, forming its outer covering. Around the entrance of the meatus are some fine hairs; and there are also ceruminous glands, which secrete the ear-wax, and open on the surface by separate orifices. The middle ear or tympanum is an irregular cavity situated within the petrous bone, and interposed between the meatus auditorius and the labyrinth or inner ear. It is filled with air, and communicates with the pharynx by the Eustachian tube. It is traversed by a chain of small movable bones, which connect the membrana tympani with the labyrinth, and serve to convey the vibrations communicated to the membrana tympani across the cavity of the tympanum to the internal ear. The cavity of the tympanum measures about five lines from before backwards, three lines in a vertical direction, and between two and three in the transverse, being a little broader behind and above than below and in front. The outer boundary of the cavity is formed by the membrana tympani, and by a small portion of the surrounding bone. This membrane is a thin semi-transparent substance, nearly oval in form, separating the cavity of the tympanum from the bottom of the auditory canal. It is directed very obliquely towards the auditory canal, its external surface being concave, its internal convex. It is composed of three layers,—an external, middle, and internal. The outer one, as already stated, is part of the integument lining the meatus. The middle layer is fibrous, being formed of fibrous and elastic tissues, and fixed in the groove of the meatus. Some of the fibres radiate from near the centre to the circumference; others are arranged in the form of a dense circular ring towards the margin of the membrane. The internal layer is mucous, being part of the mucous lining of the tympanum. The Eustachian tube is the channel through which air is conveyed from the pharynx to the tympanum. It is about an inch and a half in length, and is directed downwards and inwards to the pharynx. Like the meatus auditorius, it is partly osseous and partly cartilaginous in texture. The small bones or ossicles of the tympanum are three in number—the malleus, incus, and stapes. The malleus—so named from its fancied resemblance to a hammer—consists of a head, neck, handle, and two processes, a long and a short. The incus—so called from its resemblance to an anvil, but which may rather be said to resemble a bicusped tooth, with one of the roots longer than the other, and bent to one side—consists of a body and two processes. The stapes is so called from its close resemblance to a stirrup, and consists of a head, neck, two branches, and a base. These small bones are connected together and with the tympanum by ligaments, and moved by small muscles. The handle of the malleus is attached externally to the membrana tympani. The head of the malleus articulates with the body of the incus. The shorter process of the incus is received into an aperture of what are termed the mastoid cells; the long process curving downwards and ending in a rounded convex point, where it articulates with the head of the stapes. This last has a horizontal position, with the crura or branches directed forwards and backwards, and its base is fixed over the fenestra ovalis of the internal wall of the tympanum. This is a kidney-shaped opening leading from the tympanum into the vestibule, the opening in the recent state being closed by the lining membrane, which is common to both cavities. The inner and fundamental portion of the organ of hearing is called, from its complexity, the labyrinth, and consists of three parts—the vestibule, the semicircular canals, and the cochlea. It consists of a series of cavities channelled out of the substance of the petrous bone, communicating externally with the cavity of the tympanum, and internally with the meatus auditorius internus, which contains the auditory nerve. Within the osseous labyrinth is contained the membranous labyrinth, upon which the ramifications of the auditory nerve are distributed. The vestibule is the common central cavity of the osseous labyrinth, and is placed behind the cochlea, but in front of the semicircular canals. It is somewhat oval in form from before backwards, and measures about one-fifth of an inch in different directions, but is narrowest from without inwards. In its anterior wall is a large oval opening leading to the cochlea, and in its posterior and superior walls are five openings, by which it communicates with the semicircular canals. These are three bony canals situated above and behind the vestibule. They are of unequal length, and measure about one-twentieth of an inch in diameter; but the ends of each are dilated just before opening into the vestibule, the one end in each being more dilated than the other, and called the ampulla. They describe the greater part of a circle, and all open at both ends into the vestibule, the ends of two of them, however, coalescing. From a difference in the direction taken by these canals, they have been named the superior and posterior vertical and the horizontal. The cochlea, so called from its resemblance to a snail's shell, is conical in form, and placed almost horizontally in front of the vestibule. Its length is about a quarter of an inch, and its width at the base about the same. It consists of an axis or centre; of a canal winding spirally round it for two turns and a half from the base to the apex; and of a delicate lamina contained within the canal, which follows its windings and subdivides it into two passages. When measured along the outer side, the canal is about an inch and a half long, and its diameter at the beginning about one-tenth of an inch, but gradually diminishing to half that size towards the other end. The whole inner surface of the labyrinth, including the semicircular canals and the passages of the cochlea, is lined with a thin fibrous membrane, the outer surface of which adheres closely to the bone; while the inner is covered with a single layer of epithelium, like that on serous membranes, and secretes a thin serous fluid, called the liquor cotunnii or perilymph. This fluid fills the passages of the cochlea, and surrounds the membranous labyrinth. This last is a membranous structure enclosed within the osseous labyrinth, and separated from its lining membrane by the perilymph. It is confined to the vestibule and semicircular canals, having the general form of the surrounding bony parts, and is composed of a closed sac with rather a complex form, containing a fluid called the endolymph. That part of the membranous labyrinth contained in the vestibule consists of two rounded portions, which, though closely connected together, appear to be distinct sacs, the larger of the two, the utricle or common sinus, being situated at the posterior and upper part of the vestibule; the other, the saccule, is smaller and rounder, and is situated in the lower and fore part of the vestibule. Small calcareous masses called otoliths, consisting of minute rounded and elongated grains of carbonate of lime, are situate in the inner part of the wall of the utricle and saccule. The auditory nerve, which is distributed over the different parts of the labyrinth, enters by the meatus auditorius internus, and divides into two branches, viz., an anterior for the cochlea and a posterior for the membranous labyrinth. The cochlear branch divides at the base of the modiolus or axis into numerous twigs that enter the apertures in that body, whence they are directed outwards. The vestibular branch divides into three branches, which proceed to the membranous labyrinth, and ramify themselves on the walls of the sacs, some of the fine filaments passing through the otolith, others outside of it. The sense of hearing is, strictly speaking, only a refinement of the sense of touch. The impressions with which it is conversant arise wholly from peculiar undulations of the particles of ordinary matter, propagated in obedience to its ordinary laws through the medium in which the animal lives, and impinging more or less immediately upon a sensitive part. The trumpet-like pinna or auricle of the external ear serves to collect the sound, which is then conveyed, by means of the meatus auditorius externus, to the membrana tympani. This is thrown into vibration, which is communicated to the malleus, and is carried by the incus and stapes to the membrane of the fenestra ovalis. From this last the motion is communicated to the various parts of the membranous labyrinth, taken up by the fine filaments of the auditory nerve, and conveyed to the brain. The use of the small calcareous masses in the sacs is to strengthen the sonorous undulations, and to communicate to the nerves stronger impulses than the lymph alone could impart. The range of hearing, like that of sight, differs very much in different individuals.

Ear-shell, (*Haliotis*,) a genus of univalve mollusca, the shell of which somewhat resembles in shape the human ear. The head of the animal is large, having two long round tentacula, with eyes at the base on footstalks. Foot very large, having the margin fringed all round. It is always found near the surface of the water. Found in various warm seas, and sometimes attaining a large size. One species, the ORMER-SHELL, is found on the Guernsey coast, and is valued for the table. The shells are largely used for studs, ornamental boxes, inlaying, and similar purposes.

EARWIG, *eer'-wig*, (Sax. *ear* and *wicga*, a worm or grub.)—These insects constitute the order *Dermaptera* of Leach, but Westwood, who also regards them as forming a distinct order, has denominated them *Euplexoptera*. The latter name refers to one of the most striking characters of the earwig; viz., the structure of the hinder wings, which are exceedingly beautiful. "In these the radiating nervures, instead of finding their common centre at the base of the wing, as is the case in most Orthoptera, spring from the extremity of a broad leathery piece, which occupies about a third of the anterior margin. Other radiating nervures occupy the space between the principal nervures, but only run from the posterior margin to the middle of the wing; and the whole are united by a transverse nerve, which runs parallel to the posterior margin. By the assistance of these nervures, the wing, which is of very delicate texture, folds up exactly the shape of a closed fan; but as the wing-cases of the earwig are very short, the wings can only be got under them by a very complicated transverse folding in two places; namely, at the apex of the leathery basal piece and at a second point about the middle of the wing, where the nervures appear to be thickened. Even the apex of the firmer part of the wing projects beyond the elytra."—(*Dallas*.) Earwigs are distinguished from the orthopterous insects (excepting the Blattæ and Mantis tribes, which with the Forficula, constitute Latreille's family of *Cursoria*,) by having the posterior legs formed for running. The female has no corneous ovipositor; and a remarkable fact connected with the insect is, that she sits upon her eggs in the manner of the hen, and the young, as soon as hatched, creep under the belly of the mother for protection at the approach of danger. In both sexes the abdomen is furnished with a pair of forceps, partly of use as an instrument of defence. The antennæ are slender, filiform, and inserted before the eyes, and vary considerably as to the number of their joints. The thorax is generally of a rounded form, and but slightly convex. Ridiculous as is the fancy, there is no doubt that the insect's name, earwig, is furnished by the delusion that it will creep into the ears of sleeping persons. In all European countries the insect's appellation is significant of the belief. Newman, however, in his Introduction to the "History of Insects," says, "The shape of these wings, (the hind ones,) when fully opened, is nearly that of the human ear; and from this circumstance it seems highly probable that the original name of this insect was ear-*wing*." Earwigs appear to prefer damp situations, and are found under stones and under the bark of trees in great abundance. They subsist chiefly on the leaves and flowers of plants, and on fruits. There is in this country another species of earwig, almost equally common with the above, but of a much smaller size. This latter is found about hotbeds and dunghills, and belongs to the genus Labia. Besides these, there are five or six other species inhabiting this country, some very small indeed, and one of very great dimensions. This insect, the Sea, or Giant earwig, (*Labidura gigantea*,) is found on the sandy shores of the sea.

EARTH-WORM, (Ang.-Sax.) (*Lumbricus*, Linn.) a well-known annelid. Its outward appearance is a body composed of numerous narrow rings closely approximated to each other; the colour of the body is reddish, or purplish; of a cylindrical form, somewhat pointed at the anterior extremity, and usually a little flattened at the tail. It is without the organs of sight. The organs of motion consist of a double row of bristles running down the lower surface of the body, and which are capable of being withdrawn within small hollows when not in use. The mouth is unarmed, and the intestine runs straight through the body. The vascular system consists of two longitudinal vessels running along the ventral and dorsal regions of the body, and united by numerous branches. The blood is red. Like the leeches, this worm is furnished with ciliated canals, which have been supposed to serve as organs of respiration; but their real destination appears to be still uncertain. As far as relates to its appearance above the ground, the earthworm may be regarded as a nocturnal animal. In the night and at early morning, hundreds may be seen in localities where, during the daytime, not one is to be seen. They are of immense utility in improving the soil. The organs of the earth-worm's locomotion prevent its moving backwards, whilst the expansion of the rings, as it contracts the anterior segments and draws forward the hinder parts, widens a passage for it through the earth, whose particles were close together before. They are thus, in their multitudes, of incalculable utility in constantly loosening and stirring the soil, and accumulating on the surface those little hillocks of earth known as "worm-casts." On this subject Mr Charles Darwin, who seems to have given it long and careful attention, remarks: "The burrowing of earth-worms is a process exceedingly useful to the gardener and agriculturist; and these animals are far more beneficial to man in this way than they are injurious by devouring the vegetables set in the soil. They give a kind of under-tillage to the land, performing the same below ground that the spade does above the garden, and the plough for arable land; and loosening the earth so as to render it permeable to air and water. It has been shown, too, that they will even add to the depth of soil; covering barren tracts with a layer of productive mould. Thus, in fields which have been overspread with lime, burnt marl, or cinders, these substances are in time covered with finely divided soil well adapted to the support of vegetation. That this result, which is commonly attributed by the farmers to the 'working down' of the materials in question, is really due to the action of the earth-worms, appears from the fact that in the soil thus formed large numbers of worm-casts may be distinguished. These are produced by the digestive process of the worms, which take into their intestinal canal a large quantity of the soil through which they burrow, extract from it the greater part of the vegetable matter it may contain, and eject the rest in a finely divided condition. In this manner a field manured with marl has been covered in the course of eighty years with a bed of earth averaging thirteen inches in thickness." Besides their usefulness in the manner above described, the earth-worms are of importance as food for birds, fish, &c. Their value as bait for fishes is well known to every angler. The power of reproducing parts after mutilation is very great in this animal, as in the whole of the order. It is generally supposed that the earth-worm may be propagated by division; but this scarcely appears to be the case. It is said, however, that if it be divided across the middle, the part bearing the head will develop a new tail, although the tail will soon die; and that if the head be cut off, the body will form a new head; but it appears that both portions never survive the mutilation,—the tail portion soon losing all power of movement, and the remainder dying upwards, ring by ring.

ECHIDNA, or PORCUPINE ANT-EATER, *e-kid-nă*, (Gr.) (*Echidna hystrix*, Cuvier.)—Of this family there are two species,—*Echidna hystrix*, peculiar to New South Wales, and *Echidna setosa*, chiefly found in Van Diemen's Land. They are of the same size, and, in general appearance, resemble the common hedgehog, except that the spines are much larger, and the muzzle is long and slender, with the small mouth at the extremity. The whole of the muzzle is black, and covered with a soft, leather-like skin. They affect hilly countries, living in burrows, and feeding on insects, principally ants and termites, which they capture by the protrusion of their long viscous tongues; which latter organ, as in the case of the true ant-eaters, by an arrangement of longitudinal and annular muscles, is capable of being extended and contracted to a considerable extent. In order to enable the creature to capture its prey, a vast amount of a gummy secretion is poured over the tongue, issuing from some very large glands at its base; and so plentiful is this secretion, that it drops almost continually from the mouth, and has a very unpleasant appearance. The head of the echidna is small; muzzle much elongated, and terminating in a little mouth, which is destitute of teeth, but furnished with several rows of small spines on the palate, directed backwards. The legs are short and strong, and the feet all furnished with five toes, armed with powerful claws. With the aid of these latter, it can burrow with great rapidity, and when pursued, and not allowed sufficient time to bore a complete hiding-place in the earth, it enters itself so far as to expose only its prickly back to the threatened assault.

ECHINEIS. (*See* SUCKING-FISH.)

ECHINODERMATA, *e-ki-no-der'-mă-tă*, (Gr. *echinos*, spine, and *derma*, skin,) a class of radiate animals, the highest in organisation of that great division. They are characterised by possessing a well-organised skin, under which, or attached to it, are frequently found plates of solid matter constituting a kind of skeleton. They have a digestive and a vascular system, and a circular nervous system has been detected in many of the species. A muscular system is constantly present. The nutritive apparatus of the Echinodermata is very simple, presenting in most of the family a single orifice, destitute of teeth, in the centre of the lower surface of the body, performing the functions both of the mouth and anus; but in some presenting a digestive cavity, with an orifice for the evacuation of its contents, distinct from that by which the food is taken in. The muscular motion is generally present in these animals, but the organs of motion in them are various, the principal ones being the membranous tubes, which can be protruded at will through the ambulacral apertures, and which have been termed the feet. Whether or not the highest among the Echinodermata possess sight is not a settled matter. Among those who believe that they do, may be named Professors Ehrenberg and Forbes, and among those of a contrary opinion, Professor Rymer Jones. They are all marine animals, and are fairly represented by the star-fish, sea-urchin, and sea-cucumber.

ECTOPISTES. (*See* PIGEON, PASSENGER.)

ECTOZOA, *ek-to-zo'-ă*, (Gr. *ektos*, without; *zoos*, living,) a term applied to those parasitic animals, such as lice, ticks, &c., which live upon the external parts of other animals. The word is used in contradistinction to *Entozoa*. Those entomostracous crustaceans which are parasitic upon fishes belong to the Ectozoa. It is a matter of dispute whether these parasites are the cause of disease, or whether they are the result of previous disease.

ECHINUS. (*See* URCHIN, SEA.)

EDENTATA, *e-den-tai'-tă*, (Lat., toothless,) an order of mammalia characterised by the absence of incisive teeth in their jaws, and the length of their claws. With regard to the incisors, however, there is an exception to the rule in the case of the armadillo, (*Dasypus setosus*,) in which a single tooth is found in each intermaxillary bone, but placed so completely at the sides of these bones, that the front of the mouth is quite destitute of teeth. Even in those cases where teeth are present, they are without roots, and are not covered with enamel, so that they can hardly be called teeth, according to the usual acceptation of the word. Cuvier observes, that, "although brought together by a purely negative character, the Edentata have, nevertheless, some positive mutual relations, particularly in the great claws which encompass the ends of their toes, and which more or less approximate to the nature of hoofs; also in a certain slowness, or want of agility, deviously arising from the peculiar organisation of their limbs." The number of existing Edentata is not nearly so great nor gigantic in size as at a remote period of the world's history, as the remains of these gigantic herbivora, the *mylodon*, *megatherium*, and the *megalonyx*, testify.

EDRIOPTHALMATA. (*See* CRUSTACEA.)

EEL, *eel*, (Sax. *æl*,) a family of fishes, (*Anguillidæ*,) belonging to the apodal section of the Malacopterygii. Their long and cylindrical bodies are covered by a thick and soft skin, in which the scales are so deeply imbedded as to be scarcely apparent. The gill orifices are very small, and are situated far back; so that there is a long passage from the gill-chamber outwards; and hence, the gills not soon becoming dry, these fishes can remain a long time out of the water, some of them, indeed, leaving it of their own accord. Most of the eels are included in the Linnæan genus *Murœna*, and are divided by some naturalists into the families *Synbranchidæ*, *Murænidæ*, *Anguillidæ*, *Congeridæ*, and *Ophisuridæ*. The *Syn-*

branchidæ have the gill-passages so united under a common tegument as to present externally only a single orifice: they are almost destitute of fins. The species are few, and they are chiefly found in tropical seas. The *Murænidæ* are also generally destitute of fins. or nearly so: they are all destitute of scales, and never found in fresh water. The *Anguillidæ* are fresh-water fishes, though some of them occasionally visit the sea. They have pretty large pectoral fins, anal and dorsal fins extending to and encompassing the tip of the tail, and numerous longish scales embedded in groups in the skin, so as to resemble lattice-work. *Ophisuridæ*, or snake-eels, are distinguished by the tail ending in a conical pointless fin. At least three species of eels are found in this country,—the Sharp-nosed, the Broad-nosed, and the Snig. The first-mentioned, which is common in streams and lakes, is distinguished, as its name implies, by its comparatively long and narrow muzzle. Its colours are dark olive-green on the upper surface of the head and body; under surface silvery white. The clearer the stream in which the eel lives, the more vivid are its colours. The broad-nosed eel is not uncommon, and is often found in the same waters with the sharp-nosed, from which, however, it is to be readily distinguished by the comparatively greater breadth of its head and the situation of its eyes, which are placed in advance of the angle of the mouth; the body, moreover, is thicker in proportion to its length, and the teeth more numerous and stronger; and the dorsal and anal fins, which are much deeper and thicker, commence farther back. In some parts of England this sort is known as the grig-eel. The snig is in many respects intermediate between the broad-nosed and sharp-nosed species: its colour is closely like that of the sharp-nosed eel. "In the comparative breadth of the nose," says Mr Yarrell, "the snig is intermediate in reference to the broad and sharp-nosed eels, but rather more resembles that with the sharp nose. It has a slight but elongated depression extending from the anterior edge of the upper jaw to the upper and back part of the head; the tubular openings of the nostrils are longer, and the mucous pores about the lips larger and more conspicuous; both jaws rounded at their extremities, the lower one the longest; teeth longer and stronger than in the common sharp-nosed species; gape large; the angle and the posterior edge of the eye on the same vertical line; the pectoral fins, the commencement of the dorsal fin, and the vent, are each placed nearer the head than in either of our fresh-water eels." The snig is considered superior to other kinds for the table; but the sharp-nosed eel attains the greatest size,—sometimes five-and-twenty, and even thirty pounds weight. The eel migrates at the approach of winter to warm estuaries, generally brackish, and at times perfectly salt. Those, however, which live in ponds, and cannot emigrate, bore down into the mud, and there remain during the colder months of the year. They are sometimes dug out of the mud-banks of rivers and lakes in considerable quantities. Mr Yarrell mentions that the London market is supplied with eels by Dutch fishermen, from Holland. There are two companies in Holland, having five vessels each. Each ship is built with a capacious well, in which large quantities of eels are stored till they are wanted. Each vessel carries a cargo of this fish, weighing from fifteen to twenty thousand pounds, the duty on which cargo is £15.

Eel, Conger. (*See* Conger Eel.)

Eel, Electrical. (*See* Electrical Eel.)

Eel-pout, the name given in some parts of England to the turbot.

Egg, *eg*, (Sax. *æg*, Lat. *ovum*,) a body produced in the females of birds and certain other animals, containing an embryo or fœtus of the same species, or the substance from which a similar animal is ultimately produced. Those animals in which reproduction takes place by means of eggs are called oviparous. The marsupial quadrupeds and the monotremata form the connecting link between the warm-blooded animals which are oviparous and the truly viviparous animals, which only belong to the mammalia. The number of eggs produced varies greatly in different animals; some birds only produce one egg in a year, while others produce as many as twenty. The roe of some fishes contains myriads of eggs. The eggs deposited by some animals are enveloped in a gelatinous substance; others are connected in various ways, sometimes being in the form of a string. The eggs of a large number of birds are used as articles of food, those most generally used belonging to the class of birds called poultry. The common domestic fowl, the turkey, and the pea-hen, are birds whose eggs are most generally used all over the world. In some of the islands of Scotland, the eggs of several species of sea-birds, such as the gull and guillemot, form an important article of food among the inhabitants. Although the eggs of birds are principally eaten, the eggs of the turtle are also considered a luxury; and the eggs of fresh-water tortoises are valuable for the oil which they yield. An ordinary hen's egg has an average weight of 875 grains, of which the shell and its inner membranous coating weigh 93·7 grains; the albumen, or white, 529·8 grains; and the yolk 251·8 grains. The shell contains about two per cent. of animal matter, and one per cent. of the phosphates of lime and magnesia, the rest consisting of carbonate of lime, with a trace of carbonate of magnesia. (*See* Albumen.)

Egg-bird, (*Hydrochelidon fuliginosum*, or *Sterna fuliginosa*,) a bird of the Gull family, sometimes called the Sooty Tern. It is somewhat larger than the other members of the Tern family, and has a long and sharp bill, nearly straight, compressed, and slender; wings narrow, long, and pointed; tail deeply forked; colour glossy black on the upper parts, edges of wings, forehead, and under parts white. It abounds in the West Indian seas, and is chiefly valuable for its eggs, which are about two inches long, cream colour, sparingly streaked with purple. So highly are these eggs esteemed, that their gathering is quite a considerable trade. The nest of the egg-bird is made in the sand, and the eggs number from one to three.

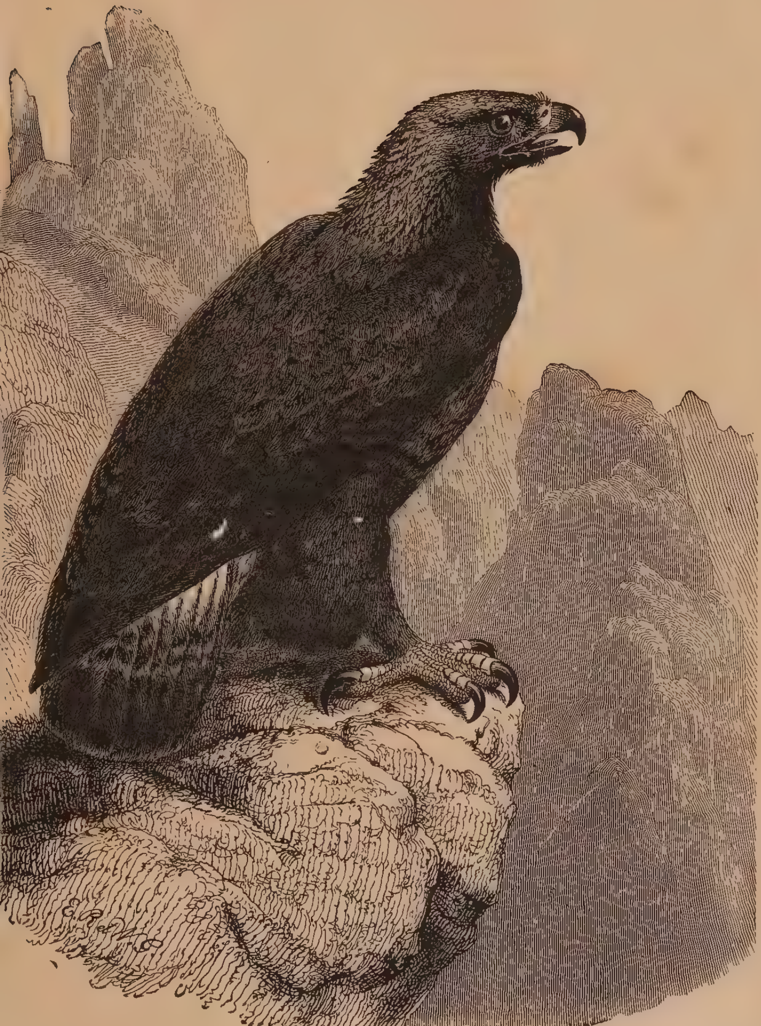
Egret. (*See* Heron.)

Eider Duck, (*Somateria mollissima*,) a species of wild duck inhabiting the frozen regions of the north. It is very abundant in Iceland, Lapland, Greenland, and Spitzbergen, on the shores of Baffin's Bay, &c. Generally, it is of a size intermediate between the domestic duck and goose. The head is large; the middle of the neck small, with the lower part of it spread out very broad, so as to form a hollow between the shoulders. The bill is horn-colour, the upper mandible being forked in a singular manner towards each eye, and covered with white feathers on the sides as far forwards as the nostrils. The top of the head is soft velvety black, cleft behind by a narrow streak of white; the feathers from the nape of the neck to the throat are puffed out, and look as though the ends had been clipped. The cheeks, chin, upper part of the neck, the black, and lesser wing-coverts, are white; bastard wings and primary quills brown; the front part of the neck to the breast is dun-colour, and thence to the under part of the tail deep black; tail brown; legs short and yellow. In Iceland and Norway the breeding-grounds of eiders are carefully protected, so that as little as possible may interfere with the growth of the eider-down crop. This curious and beautiful down grows on the breast of the bird, and the mode adopted to procure it is somewhat singular. The nest is composed of seaweed, and any hole or ledge is evidently considered an eligible building site. The number of eggs laid is usually five, six, or seven: they are three inches long, two broad, and of a uniform pale green. When first deposited in the nest, they are allowed to go uncovered; but in a few days the mother begins to pluck the down from her breast, and to cover them over; and this process would seem to be indispensable to the growth and hatching of the young birds; for, if the nest be plundered, till the female has left no more down on her breast, the male bird will begin to furnish the comfortable covering from his own body. The common practice is to remove the whole of the eggs with the down, twice, and to leave the third lot of eggs, that the birds may not be thinned in number. The gross weight of the down yielded by one bird in a single season is half a pound; but this, when cleaned, is reduced by one-half. The elasticity of eider-down is so extreme that three-quarters of an ounce will fill a man's hat. It is capable of great compression, so that the down makes its appearance in balls no larger than a breakfast-cup, but weighing about three pounds. The flesh of the eider duck, though not so toothsome as that of the species familiar to us, is fit to be eaten, and is said to become of excellent flavour when the bird is wholly or even partially domesticated. They are evidently capable of easy domestication, at least with persons who reside near the sea. The Hon. A. Dillon, who spent a winter in Iceland and Lapland, relates that five of these birds chose as their location the ground under a narrow bench that ran along the windows of his house, and that when approached they evinced no timidity, and would even allow their backs to be stroked.

Eland, *e'-lănd*, (its name at the Cape.)—This animal, considerably the largest of all the antelopes, is known by several different names, —the Impoofoo, Eland, Cape Elk, or Canna, are among the many terms applied to it. The ordinary eland is a large heavy animal, weighing, at full growth, from 7 cwt. to 9 cwt.; and, contrary to the rule amongst antelopes in general, is prone to be fat. Its usual size is that of a full-grown horse, measuring generally a little more than eight feet in length, and standing full five feet at the shoulder. The horns of the male are thick and heavy, and about a foot and a half in length. They are straight till they arrive at about three inches from the tips, where they bend outwards. They are also surrounded by a thick spiral wreath, which becomes indistinct at the points. The horns of the female eland are longer and smaller, and the spiral wreath is often absent. In both sexes the head is long and pointed, the ears large, the neck thick, and in front of the chest is a loose hanging skin or dewlap, with a border of long hair on its margin. A short erect mane of dark brown hair runs from the centre of the forehead to the root of the tail. This mane is directed backwards along the spine, but is reversed on the neck. The tail is more than two feet long, and terminates in a tuft of long black hair. The flesh of the eland is more prized as food than that of any other wild animal of Southern Africa. When dried and cured, the large muscles of the thighs are looked upon with high estimation, and are usually called thigh-tongues. Elands were formerly very common in the neighbourhood of Cape Town; but they have been so universally hunted, that they are only to be met with in the most retired parts of the colony. The disposition of the eland is very mild and gentle, and it seems predisposed to domesticity. It is gregarious, and lives in large herds upon the low hills and level plains. Elands, when hunted, are soon tired, as they are usually fat and short of wind. Very often they drop down during a chase from plethora. Of late years there have been many attempts made to introduce the eland among the animals used for food in England. The attempts have all been successful, and not only in the Zoological Gardens in Regent's Park, but also in the grounds of noblemen and private gentlemen, the eland has been reared and bred. Concerning its flesh as food, Dr Livingstone, the celebrated African traveller, writes as follows: "Our party was well supplied with eland-flesh during our passage through the desert; and it being superior to beef, and the animal as large as an ox, it seems strange that it has not yet been introduced into England." The Acclimatisation Society has given much attention to the qualities of the eland; and it is more than probable that in a few years it will be largely bred in Great Britain. The scientific name of this animal is *Oreas canna*.

Elanus, *eel'-ăn-us*, a genus of falcons, found in several parts of the Old World, of which the black-winged falcon (*Elanus melanopterus*) is a good example. It is remarkable for a strong musky odour, which is thought to be due to the insects on which it mostly feeds, and which it captures on the wing.

Elateridæ, *ee-la-ter'-rid-dee*, a family of beetles with long and rather spindle-shaped bodies. The hinder angles of the thorax are lengthened into spines, and the head is sunk into the thorax as far as the eyes. The legs are very short, so that when the insect is on its back it cannot recover itself. By means, however, of the structure of the thorax, it can always regain its position. Bending back the thorax, and then snapping the spines into a couple of hollows, it leaps from the ground, and



EAGLE, GOLDEN.

is thus enabled to fall on its feet. Sometimes it again comes on its back, and in that case it repeats the process. On account of their leaping powers these beetles are called Skipjacks, and the clicking noise of the thorax has earned for them the title of Click-beetles. The fire-flies of hot climates mostly belong to this family. In our own country, they are chiefly notable on account of the damage which is done to corn by their larvæ, which are well known under the name of Wire-worms.

Elbow, *el'-bo,* (Sax. *elneboga,*) in Anat., is the joint of the arm formed by the lower end of the humerus and the upper end of the radius and ulna. The lower end of the humerus is received into the hollow of the ulna, so as to produce a hinge-like arrangement, and the upper end of the radius forms also a small part of the joint. The surface of the humerus in contact with the ulna is limited, internally and externally, by a prominent ridge, and is hollowed out in the centre; that in contact with the radius is a small rounded eminence which moves in the cavity of the latter. On front of the humerus, above the articular surface, are two depressions that receive the coronoid process and the head of the radius during flexure, and behind is a large fossa for the reception of the olecranon, or large process of the ulna, in the extension of the forearm. Where the bones touch, their surfaces are covered with cartilage, and their articular ends are kept in place by a number of ligaments.

Electrical Eel, (*Gymnotus electricus.*)—This extraordinary fish is an inhabitant of the fresh-water lakes and rivers of the warmer regions of America, Africa, and Asia. A specimen more than three feet in length was preserved alive in London between the years 1838 and 1842, and was examined by a great many electricians. Like the *torpedo,* (*which see,*) it has the power of giving electrical shocks; which power it exerts for killing or stunning the fishes upon which it feeds. Its body is smooth and without scales. A long ventral fin extends from behind the head to the extremity of the tail; the mouth is armed with sharp teeth, and projecting into it are numerous fringes, that, from their nature, appear to serve a purpose in respiration. The gullet is short, terminating in a capacious stomach. The electrical organs are situated on each side, and consist of flat partitions or septa, and cross divisions between them. The outer edges of these septa appear, when the skin of the body is turned over, in parallel lines, nearly in the direction of the longitudinal axis of the body. They are thin membranes nearly parallel to one another, their breadth being nearly the semi-diameter of the body. A powerful shock is felt when one hand is placed near the head and the other near the tail. By the electricity generated by the specimen exhibited in England, Faraday magnetised steel needles, and decomposed iodide of potassium with the greatest ease. A single medium discharge from the animal is calculated to be equal to the electricity of a Leyden battery of fifteen jars, containing 3500 square inches of coated glass, charged to the highest degree.

Eleotragus. (*See* Riet-bok.)

Elephant, *el'-e-fănt,* (*Elephas.*)—This is the largest of existing Pachydermata. In ancient times the most curious notions were entertained concerning it, not the least quaint being that it had no joints. Aristotle and Pliny were firm adherents to this doctrine. There can be little doubt that this delusion sprang from the fact that the elephant seldom lies down either in a wild or captive state. They have been surprised by hunters standing and yet fast asleep. Captain Denman so encountered and shot an elephant. With regard to its disinclination to lie down when domesticated, it is recorded that one belonging to Louis XIV. never assumed any but a standing position during five years. In this case, however, there was evidence that other than natural causes impelled the elephant to remain on his legs; for he was at great pains to scoop in the stone walls of his house two deep holes, in which he inserted his tusks before sleeping. Were the elephant's legs formed like those of other quadrupeds, the labour of raising his immense carcase from the ground might account for his dislike to a recumbent position; but his structure is such that lying down and rising are matters of but little difficulty. Instead of bringing his hind legs *under* him when he lies down, he extends them behind him, in the position of a kneeling human being; when he wishes to rise, he simply draws his hind feet gradually under him, and his enormous weight is levered up with perfect ease. This mobility of limb is of vast service to the elephant in the performance of his duty as a beast of burden; and with a *howdah* on his back containing eight or ten persons, and the driver on his neck, he can descend steep hills with perfect safety. He manages in this way: kneeling down at the commencement of the declivity, he puts out one fore-leg and feels cautiously for a safe footing; if he does not find it, he hammers at the soft soil with his heavy foot until he has made an indentation sufficient to secure firm footing. One foot thus accommodated, the other is drawn out with equal care, and provided for in the same manner as the first. Then one of the hind legs is cautiously drawn forward and one of the fore feet being released from the foothole, it is inserted in its place: and all this is performed so rapidly that it might be repeated at least three times in as little time as it takes to write this explanation. It is almost needless to observe that the elephant is distinguished by the possession of a long trunk or proboscis, which serves him in place of a hand, and enables him to perform many extraordinary feats. Without this curious appendage he would find existence difficult, if not impossible. Elephants sometimes go blind while in a state of freedom, but, guided by this exquisite organ of touch, they are still enabled to make their way through dense forests, to gather food, and to avoid ditches and hollows. The elephant's trunk is not composed of a mere series of muscular rings, as its appearance would lead one to suspect. It has three perfect and distinct uses. As an organ of smell, it is an elongated and curiously elastic nose. Within it two canals are continued from the nostrils, which are reflected round the nasal bones and then proceed straight to its end. These canals are separated by, and embedded in, a fatty elastic membrane containing thousands of minute muscles. Of these there are three sets,—an outer longitudinal, composed of four layers; an oblique set, which are variously directed; and a third set, which radiate from the tubes to the circumference. They are very small, and supposed to number as many as forty or fifty thousand. Besides as an organ of smell, the elephant's trunk serves as a sucker, by which the great animal may quench his thirst at the shallowest pools. There is no passage from the trunk to the mouth; but the former may be filled, and then, the mouth of it being turned under and into the proper mouth of the elephant, the operation of drinking is accomplished. The elephant is very tenacious lest harm should come to this valuable organ. Some time ago one was confined in a menagerie at Dublin, and by some misfortune the building and the animal were destroyed by fire. As no trunk could be found, it was concluded that it had been consumed; but on closer examination it was found almost to a depth of *two feet* into the hard floor of the den. This proboscis also allows the animal to walk under water, for it can keep the extremity of the trunk above the surface, while it walks across the bed of a river. It is also in the habit of cooling itself by drawing up water with its trunk and spirting it over the body; and it can even withdraw water from the stomach and employ it in the same manner. In order to enable the trunk to perform these offices, no less than fifty thousand muscles are employed in its construction. The dentition of the elephant is of a very remarkable nature. From the upper jaw extend two enormous teeth fixed in sockets in the front of the mouth, but which, in fact, are neither incisors nor tusks, although by the latter term they are generally known. They spring, however, from the intermaxillary bones, and must be regarded as the representatives of the incisors. They grow from a permanent pulp, and continue to increase in size during the life of the animal. The incisors are wanting in the lower jaw, as are also the canines in both jaws; and the only other teeth possessed by this immense quadruped consist of two molars of a most remarkable structure on each side of each jaw. These teeth are of a very large size, and a quadrangular form. They consist of a series of plates of the ordinary substance of teeth, (*dentine*,) each coated with a layer of enamel, and united together into a mass by a material called the *cement*. The form of these transverse plates of dentine and enamel varies greatly in the different species. The formation of the molar teeth, like that of the tusks, is going on as long as the elephant lives; but with this difference, that whilst after shedding the first or milk tusks, the pulp of each tusk continues adding matter to its base without any change, in the case of the molars it is a succession of separate teeth that is produced, the hindermost pressing gradually forward to take the place of those which have been abraded by use, and cast off as unserviceable. The period of gestation of the elephant is a few days over twenty months. The breasts of the female are placed under the chest, and the young one sucks not with the trunk but with the mouth. The strongest proof of the elephant's antipathy to a recumbent position may be drawn from the fact that although the new-born calf is much too short to reach the teat, the mother, rather than lie down, will extend her legs so as to bring her breast nearer the earth. In a state of domesticity, the elephant-keeper will, under such circumstances, build a little platform of earth for the elephant-calf to stand on while it sucks. At its birth, the calf is about thirty-six inches in height. Weaning a young elephant is, by all accounts, a formidable undertaking. A celebrated English traveller thus describes the business:—"About two-and-thirty females with their young ones were driven into the enclosure, and shortly afterwards there also went in four great male elephants, the riders of which had in their hand a long rope with a noose in the end. After many unsuccessful attempts, they succeeded in snaring one of the calves by the hind leg. This was a difficult matter to accomplish, for, besides its own opposition, it was protected by the adroitness of several of the grown females, who crowded round it. So outrageously did the calf struggle, that the big males had frequently to beat him, and I observed that once or twice they lifted him with their trunks literally off his legs." There are at least two living species of the genus Elephas,—the Indian (*Indicus*) and the African (*Africanus*.) The latter is confined to the southern parts of Africa, and is distinguished from the former by the convexity of its forehead, the enormous size of its ears, and the lozenge-shaped arrangement of the dentine and ivory in its molar teeth. The Indian or Asiatic elephant has the forehead concave, the ears of moderate size, and the dentine and enamel of the teeth arranged in transverse bands. It differs likewise from the African species by the paler brown of the skin, and in having four nails on the hind feet, instead of three; and its tusks are smaller, although in size and weight the Indian elephant exceeds the other. The largest tusk on record is spoken of by Kloknes as having been sold at Amsterdam: its weight was 350 lbs. According to a celebrated elephant-dealer, an animal's "points" should appear as follows:—"Ears large and rounded, not ragged and indented at the margin; eyes dark hazel, and free from specks; roof of the mouth and tongue without dark or black spots of any considerable size; trunk large; tail long, with a tuft of hair reaching nearly to the ground; five nails on each forefoot, and four on each of the hind ones; head well set on, and carried rather high; arch or curve of the back rising gradually from the shoulder to the middle, and thence descending to the insertion of the tail; all his joints firm and strong." It is conjectured that elephants attain their full growth at about their twentieth year. Their size has been greatly exaggerated. In former times it was thought a common thing for the elephant to reach a height of twenty feet; but it is now pretty certain that ten feet is tall, and twelve feet an extraordinary height for one of these animals. Among the Singhalese the belief is still prevalent that the elephant attains the age of two or even three hundred years; it, however, is a tolerably well-ascertained fact that the duration of life in these animals is from seventy to eighty years. There are records of the elephant living to a greater age than this. Amongst the papers of Col. Robertson, (son of the historian of Charles V.,) who held a command in Ceylon in 1799, shortly after the capture of the island by the British, is one showing that a decoy was then attached to the elephant establishments at Matura, which the records proved to have served under the Dutch during the entire period of the occupation, (extending to upwards of 140 years,) and was said to have been found in the stables by the Dutch, on the expulsion of the Portuguese in 1656. The number of elephant tusks brought to England is very large. In Sheffield alone it is stated that upwards of 46,000 tusks are annually consumed. The workers in ivory in that town are above 500 in number, and the value of the ivory is enormous.—Ref. *Wild Sports of the World*, by James Greenwood.

Elephant's Tusk, a genus of molluscs belonging to the family Dentalidæ or Tooth-shells. These shells look very much like the tusks of elephants, and are perforated throughout their entire extent, having both ends open. The animal which makes them is attached to the small end of the shell. In some parts of Africa, these shells are used as coins, and strung together in chains, each chain containing a certain number.

Eleutheropomi, *ĕl-lew-ther-o-poam'-i*, a sub-order of chondropterygian fishes, in which the gills are free. The sturgeons and chimæras belong to this sub-order.

Elevator, *el-e-vai'-tor*, (Lat.,) in Anat., is a term applied to various muscles of the body, whose action is to lift up or elevate the parts to which they are attached; as the elevator muscles of the eye, mouth, &c. It is also the name given to an instrument in surgery, employed for raising depressed portions of the bones of the skull.

Elk, or **Moose Deer**, *elk*, (Sax. *elch*,) (*Alces Malchis*,) the largest of all the Deer tribe, and common to the northern parts of both hemispheres. The antlers of this animal are comparatively short, but broadly dilated, and terminated by a numerous series of long points. When fully grown, these organs weigh from fifty to sixty pounds. The moose does not reach its full development till its fourteenth year, and then may be met measuring six or even seven feet at the shoulders. Its legs are very long; its neck thick and short; its head elongated, and terminated by a broad muzzle. The coat of the moose is composed of long bristly hair, of a light ash-colour, and of a dark russet-brown on the surface. In the winter the coat of the bull moose changes to a glossy black. From behind the ears down the neck and part of the back extends a mane, harsh and thick, and nearly a foot in length. The hair on the belly and inside the legs is sandy colour. Pendent from the spot where the junction of the head and neck occurs is a baggy pouch covered with long black hair, and known as the "bell." The food of the moose consists during the summer months of such leaves and tender branches as abound in his native forests. In the winter season it subsists on the tops of young shoots, pulling them into its mouth by its prehensile upper lip, (or mouffle,) and biting them off. When pressed by hunger, however, it will eat any green thing it meets, except the foliage of the spruce-tree; which, according to recent observations. it never touches. It readily eats grass, which, unless very tall, or growing on a bank, it cannot, from its stiff and short neck, crop without straddling awkwardly. Its flesh is highly esteemed as an article of food, especially when smoked or dried bacon-fashion. "The mouffle" is the most choice bit, and is said to be, when boiled, rich and gelatinous, and to resemble the renowned green fat of the turtle. "As the flesh of the elk is palatable, and the horns and skin extremely useful, the animal is much persecuted by hunters. It is a swift and enduring animal, although its gait is clumsy and awkward in the extreme. The only pace of the elk is a long swinging trot; but its legs are so long and its paces so considerable, that its speed is much greater than it appears to be. Obstacles that are almost impassable to a horse are passed over easily by the elk, which has been known to trot uninterruptedly over a number of fallen tree-trunks, some of them five feet in thickness. When the ground is hard, and will bear the weight of so large an animal, the hunters are led a very long and severe chase before they come up with their prey; but when the snow lies soft and thick on the ground, the creature soon succumbs to its lighter antagonists, who invest themselves in snow-shoes, and scud over the soft snow with a speed that speedily overcomes that of the poor elk, which sinks floundering into the deep snow-drifts at every step, and is soon worn out by its useless efforts."—(Wood's *Natural History*.) The most successful way of hunting the moose is by "calling;" that is, imitating the trumpeting noise made by the female at the pairing season, to attract the bull. Something like "quoh quorh" is the sound, and, by means of a tube of birch bark, the skilful hunter is enabled to simulate it exactly. Shy as the gazelle at other times, the bull moose swiftly obeys the invitation, and is thus brought within range of the rifle of the hunter, who is concealed in the thicket. In the winter the elk sometimes forms a "pound" or "yard," by continually trampling the snow in a circle of considerable dimensions, so that the animal is at last surrounded by a wall of several feet in height, consisting of the still untrodden snow. To find one of these yards, is always a fortunate circumstance with a hunter, as the beasts are sure to be in good condition, and unable to run for any great distance through the deep snow. — (*Wild Sports of the World*.) The moose, or elk, if taken young, is capable of domestication, and may be used as a beast of draught or burden. Its skin is used for many purposes, and can be made into very strong leather.

Emberiza. (*See* Yellowhammer.)

Embryo, *em'-bre-o*, (Gr. *embruon*, from *embruo*, I bud forth,) is the rudimentary state of any organised body. In Physiol. it is applied to the fœtus *in utero* before the fifth month of pregnancy, from its growth resembling the budding of a plant. Hence we have *embryology*, a description of the embryo; *embryotomy*, or the extraction of the embryo piecemeal in delivery.

Emgalla. (*See* Vlacke Vark.)

Emperor Moth, (*Saturnia pavonia minor*,) one of the most beautiful of the British species of moths. The expanse of its wings is about three inches. The colour is a grayish brown, tinged with purple; the back part of the wings has a band of pale brown and purple, the last band being much waved. In the centre of each wing is a large spot consisting of a black pupil with a yellow or gray iris, partly surrounded by a light blue crescent. The larva is of a green colour, with a black band on each segment, ornamented with pink tubercles, bearing a whorl of six hairs, diverging like a star. The cocoon of the emperor moth is very curiously constructed, the extremity not being closed, but terminated by a converging circle of stiff hairs, which enables the insect to make its escape, but entirely prevents the entrance of all intruders. This moth is of the same family as the silkworm moth, (*Bombycidæ.*) and the largest European species is the peacock moth, (*Saturnia pavonia major,*) which attains a width of five inches between the wings.

Emu, *e'-mu*, (*Dromaius Novæ Hollandiæ*, or *Dromaius ater.*)—This bird is widely diffused over the southern part of Australia, and is closely allied to the cassowary. When fully grown, it measures seven feet in height. The plumage is, for the most part, a mixture of gray and brown, paler below than above; head covered with feathers, which, together with those about the neck, are of a hairy texture. The long feathers observable in the wings of the cassowary are wanting in the emu; but instead of them it has real wings, though of so small a size as to be useless for flight. The legs are short and stout; there are three toes to each foot, and these are furnished with nearly equal claws. It is very swift, and when attacked kicks, as does the ostrich, but not forwards, as does the latter bird, but more as a cow kicks, sideways or backwards. The nest of the emu is made by scooping a shallow hole in the ground in some scrubby spot; concerning the formation of the nest, however, there are various opinions. Its eggs are dark green, and the number laid varies from seven to thirteen. Dr Bennett remarks there is always an odd number, some nests having been discovered with nine, others with eleven, and others, again, with thirteen. In size the emu's eggs nearly equal those of the ostrich. They are monogamous, and the males, as in the case of the females, perform the duties of incubation. The eggs are eagerly sought after by the natives as an article of food, as is also the bird itself for the sake of its flesh, which, particularly that about the hind quarters, is said to be of good flavour. The emu would seem to have been unknown in Europe until the sixteenth century, when the Dutch, on their return from one of their earliest voyages to India, brought one from the island of Tara. For a considerable time this bird was exhibited for money at Amsterdam, and finally it came into the hands of the Emperor of Germany. In the year 1671 an emu was sent by the governor of Madagascar to the king of France, which was kept alive for four years in a menagerie at Versailles. A peculiarity in the anatomy of the emu should be noticed. "It is the largest bird after the ostrich, from which it differs sufficiently in its anatomy, for it has short intestines and small cœca, wants the intermediate stomach between the crop and the gizzard, and its cloaca does not in proportion exceed that of other birds."—(*Cuvier.*)

Emydidæ, *ee-my'-did-dee*, a family of tortoises, with flat skin-covered heads, flat and broad feet, and a solid thorax with bony plates. The terrapins, box tortoises, and mud tortoises belong to this family.

Emydosauri, *ee-my-do-sau'-ri*, an order of lizards, in which the body is covered with bony plates. The crocodile and alligator belong to this order.

Encrinite, *en'-krin-ite*, (Gr. *en*, and *krinon*, a lily,) in Geol., any fossil crinoid, or lily-like echinoderm. (*See* Echinodermata.) The encrinites, which form a most important class of fossils, are characterised by their long many-jointed stalks, surmounted by flower-shaped bodies, which are furnished with numerous finger-like rays, capable of closing and expanding. Their internal calcareous skeletons in scattered joints and fragments are so abundant in some carboniferous limestones as to compose the greater portion of the mass; hence the term *encrinal* or *encrinital limestone.* The minuter joints of the fingers and rays are usually termed *entrochi,* or wheel-stones, and the limestones in which they abound, *entrochal limestone.* The stalk of the encrinite was perforated by a canal, which kept the whole in vital action, and the separated joints have consequently some resemblance to beads,—a resemblance which has obtained for them the common names of "St Cuthbert's beads," "wheel-stones," and "pulley-stones." It is usual to apply the term *Encrinites* to the genera having rounded and smooth stems; those having pentagonal and ornamented stems being termed *Pentacrinites;* those having pear-shaped receptacles, *Apiocrinites;* and those with receptacles forming more or less perfect cups, *Cyathocrinites.* Geologically, the encrinites range from the Silurian up to the present epoch. They occur most abundantly in Palæozoic and Mesozoic strata, rarely in Cainozoic, and are now only represented by the comatula or feather-star, and the all but extinct pentacrinus of the West Indies. Like the corals, their function seems to have been, to a great extent, the secretion of lime from the ocean,—whole strata of limestone, Silurian and Carboniferous, being almost entirely made up of their remains.

Engraulis, a generic name of the Anchovy.

Enneoctonus. (*See* Butcher-bird.)

Entellus Monkey. (*See* Hoonuman.)

Entomology, *en-to-mol'-o-je*, (Gr. *entomon*, an insect; *logos*, a discourse,) that branch of science which treats of the habits, properties, and organisation of insects. The name "insect" implies an animal insected or divided into segments. This term is applicable to the principal part of the articulate sub-kingdom, and was formerly applied to it; at present, the word "insect" is only used in reference to those articulated animals which are distinguished by antennæ and breathing organs composed of ramified tracheæ, with or without air sacs. The science of entomology presents to the student of nature the most numerous and diversified objects worthy of attention. The observation of the structure and instincts of insects is full of interest, and has at all times engaged the attention of men of science. Along with other branches of natural history, the study of entomology was cultivated by Aristotle and other philosophers among the ancient Greeks. Pliny does not add much in his works to the information given by Aristotle, and it was not studied as an absolute science till the seventeenth century, when progress began to be made. The chief naturalists of that period were Goedart, Swammerdam, Malpighi, Leeuwenhoeck, and Ray. The science, however, was very backward, as Ray estimated the whole number of insect species in the world at 10,000. At the present day, it has been ascertained that a larger number than this exists in this country alone.

During the eighteenth century, the great Swedish naturalist Linnæus gave his attention to the study of entomology, and his classification, as far as the orders are concerned, has served as the basis of all that have been since promulgated. It is founded on the presence or absence of the wings, their number, consistence, surface, position in repose, and also on the presence or absence of a sting. By this classification, insects were at first divided into seven classes; but additions and alterations have been made since that time. The following classification, adopted in the "Encyclopædia Britannica," is taken from an admirable article by James Wilson, of Woodville. Eleven different orders of insects are enumerated:—1. Coleoptera, (Gr. *koleos*, a sheath; *pteron*, a wing,) including all those kinds commonly called beetles. Their membranous wings, which are the true organs of flight, are protected by a superior and anterior pair of harder consistence, called elytra. They are all masticators, and are provided with mandibles and maxillæ. 2. Orthoptera, (Gr. *orthos*, straight; *pteron*, a wing,) including crickets, grasshoppers, locusts, &c. The upper wings are of the consistence of parchment, reticulated, and more or less incumbent. The mouth is provided with mandibles and maxillæ. 3. Hemiptera, (Gr. *hemisu*, the half; *pteron*, a wing,) including the Cimices or bugs, the water-scorpions, Cicadæ or frog-hoppers, aphides, &c. A portion of their upper wings is usually membranaceous, or of the same consistence as the inferior pair. The mandibles and maxillæ are replaced by a sheath and sucker. 4. Neuroptera, (Gr. *neuron*, nerve; *pteron*, a wing,) including libellulæ or dragon-flies, ephemeræ, &c. Both pairs of wings are membranous, naked, and finely reticulated; mouth adapted for mastication, and furnished with mandibles and maxillæ. 5. Hymenoptera, (Gr. *humen*, a membrane; *pteron*, a wing,) containing wasps, bees, ichneumon-flies, &c., and characterised likewise by membranous naked wings, which, however, present fewer nervures, and are not reticulated, as in the preceding order. The mouth is furnished with mandibles and maxillæ, and the abdomen of the female is terminated either by an ovipositor or a sting. 6. Lepidoptera, (Gr. *lepis*, a scale; *pteron*, a wing,) containing all butterflies and moths, and generally characterised by the farinaceous or scaly aspect of the organs of flight, and the tubular or thread-like extension of the parts of the mouth. 7. Strepsiptera, (Gr. *strepsis*, a turning or twisting; *pteron*, a wing,) including a few peculiar and parasitical species belonging to the genera Stylops and Xenos. 8. Diptera, (Gr. *dis*, twice; *pteron*, a wing,) including the house-fly, and other two-winged kinds. The mouth is furnished with a proboscis, and there are two organs, called poisers or balancers, (*halteres*,) placed behind the true wings, one on each side. 9. Suctoria, (so designated from their sucking propensities,) is constituted by the genus *Pulex* of Linnæus, and differs from the ensuing apterous orders in undergoing a regular metamorphosis, and possessing what some regard as the rudiments of elytra. 10. Thysanoura, (Gr. *thiazo*, I dance; *oura*, a tail,) likewise an apterous order, including the Poduræ and other tribes. It evidently derives its name from the springing propensities of its order, which leap by means of a setiform process bent beneath the abdomen. 11. Parasita, (so named from their parasitical or adhesive propensities, because they dwell on the bodies of other animals,) contains the genus *Pediculus* of Linnæus, and the Nirmi, or bird-lice. (*See* the articles on the above orders for their particular characteristics.)

Entomostraca, a sub-class of crustacea, in which the shell is horny and leathery, in one or more pieces; the feet are jointed and fringed, and the gills are attached to the feet in pairs. All the minute water-fleas, cyclop , and others, belong to this sub-class.

Entozoa, *en-to-zo'-ă*, (Gr. *'entos*, within; *zoon*, an animal,) a term applied to those animals which live within others. They are of low organisation, and generally vermiform in structure. In most cases the blood is colourless, and circulates, in the higher organised species, in a closed system of vessels. They have no respiratory organs, no articulated members for locomotion, and no organs of sense. In the higher organised entozoa, a filamentary nervous system has been recognised. Several species of entozoa infest the human body. (*See* Intestinal Worms.)

Eocene, *e'-o-sene*, (Gr. *eos*, the dawn; *kainos*, recent,) in Geol., a term introduced by Lyell to designate the Lower Tertiary strata, from the idea that the very small per centage of still existing species among the fossils of these strata indicates what may be regarded as the *dawn* or commencement of the present condition of creation.

Eolis, *ee'-ŏ-lis*, a genus of nudibranch mollusks, in which the gills are like papillæ, and arranged along the sides of the back.

Epeira. (*See* Spider, Garden.)

Ephemera, *e-fem'-e-ră*, (Gr. *epi*, on; *hemera*, a day,) a genus of neuropterous insects, belonging to the family of *Subulicornes* of Latreille. They have long, soft, tapering bodies, terminating in two or three long setæ. Their wings are placed nearly, or quite, perpendicularly; their antennæ are three-pointed, and very small. In the larva state they live in wet places, or under water, and enjoy an existence of two or three years; but when they attain their final stage of metamorphosis and perfect form, they are among the most fleeting of living creatures, existing often only a few hours, and propagating their species before they die. In this state they sometimes appear suddenly in myriads during fine summer evenings by the water-side, when they may be seen flitting about, and balancing themselves in the air. They are remarkable for shedding the entire skin shortly after they leave the water, and even after they can fly about. They mostly cling to the trunks of trees for this purpose, and in some cases, the willows near the water's edge are covered with these remarkable pellicles, which still cling to the tree though the insect has withdrawn from them.

Ephialtes. (*See* Owl.)

Epidermis. (*See* Skin.)

Epiglottis, *ep-e-glot'-tis*, (Gr. *epi*, upon; *glotta*, the tongue,) in Anat., is the cartilage at the root of the tongue that falls upon the glottis, or superior opening of the larynx. In figure it is somewhat oval, rather convex above and concave below, and covered by mucous membrane. It adheres inferiorly to the interior part of the thyroid cartilage by a strong elastic membrane. Its apex is loose, and always elevated upwards by its own elasticity. When the back of the tongue is drawn backwards in swallowing, the epiglottis is put over the aperture of the larynx, and thus shuts up the passage from the mouth into the larynx.

Epimachus, *ĕp-im'-ăk-us*, a beautiful genus of birds, sometimes called Plume-birds, and often confounded with the birds of Paradise, to which they bear a great resemblance, though they are in reality allied to the honey-eaters. They live in New Guinea, and are decorated with plumes of metallic splendour, and sometimes contrasted with soft flowing down, and being of the most brilliant scarlet, emerald, violet, and ultramarine.

Epizoa, *ep-e-zo'-ă*, (Gr. *epi*, on; *zoon*, an animal,) a term applied to those parasitic animals which live upon the bodies of other animals. They may be divided into two classes,—those which live on the surface of the skin, and those which live in the skin. In the first class may be mentioned fleas, lice, bugs, ticks, &c.; and in the second, the itch-insect or *sarcoptes*, the pimple-mite or *Demodex folliculorum;* together with other species of the Acaridæ.

Equidæ, *ee'-kwi-de*, an order established for the reception of the horse and its allies. Their most striking character consists in the structure of the feet, which are composed of but a single finger or toe terminating each extremity, and encased in a horny sheath or shoe. Besides this well-developed toe, however, the Equidæ possess on each side of the metacarpus and metatarsus two small rudimentary processes, which represent two lateral toes. The structure of the leg bones is much the same as in the generality of mammalia, except that the humerus and femur are comparatively short, and the bones of the forearm and shank, which are much longer, are partially ankylosed together, so that no rotatory motion of these bones can take place. The bones of the carpus and tarsus are large and solid, and resemble the bones of the other mammalia in their general arrangement. Beyond these we find a single elongated metatarsal bone, the representative of the middle toe. This is completed by three phalanges, of which the last bears the single horny hoof. Dr Gray thus defines the family of the Equidæ :—"This family (which is distinguished from all other animals by its undivided hoof, formed of the two anterior toes soldered together, its simple stomach, and its female having the teats placed on the pubes) may be divided into two very distinct types of form, —the one the asses and the zebras, which are always more or less banded with blackish brown, and have always a distinct dorsal line, the tail only bristly at the end, and have warts only on the arms, and none on the hind legs; and the true horses, which are not banded, have no dorsal line, are furnished with warts on their arms and legs, and have long hair on the tail from its insertion to its extremity." The skull of the Equidæ is of an elongated form, the jaws being well developed, the lower one especially being of great strength and power. Both jaws are provided with six incisor teeth; small canines are also present in both jaws in the males, but in the females these teeth are usually rudimentary or quite deficient. The molars are six on each side in each jaw; their worn surface is flat, and exhibits a complicated pattern of enamel, generally of a lunate form. Between the molars and incisors there is a considerable space, and in this space is fitted the bit by which the animal is guided. The hair with which the skin is clothed is short on the general surface, but attaining a considerable length on the ridge of the neck and on the tail. The eye is rather large and full, and the external ears elongated, upright, and pointed. The most important species belonging to this family is, without doubt, the horse, (*Equus caballus.*) (*See* Horse.)

Erethizon. (*See* Porcupine, Canadian.)

Erinaceus. (*See* Hedgehog.)

Eristalis, *ee-ris'-tăl-is*, a genus of Diptera, popularly called Drone-flies, because they look like bees, and having no stings are often thought to be drones. In their larval state they are very singular beings, living under water, and looking like maggots, with long telescopic tubes attached to their tails. By means of these tubes the creature can breathe, the whole insect being buried in mud, but the end of the tail projecting into the air.

Ermine, *er'-min*, (Fr. *hermine*,) (*Mustela erminia*, Linn.)—This little digitigrade animal is found generally in temperate Europe, but is common only in the north. It is not generally known that the ermine and the stoat are the same animal; the confusion arises from the change that takes place in the colour of the animal's fur at the different seasons. In the winter it is yellowish-white, the yellow hardly showing about the head, but gradually appearing more and more on the body, and increasing in intensity, so that some are of a pale yellow colour on their hind parts: then it is known as the ermine. About the end of March, however, the upper parts change to reddish-brown, of rather a dull tint, the lower parts continuing white: the tail remains black at the tip through all the changes. It is in the extreme northern regions that this change in the animal's colour takes place with greatest distinctness. With regard to the manner in which this change is brought about, naturalists are not unanimous. One of the highest authorities, however, Mr Bell, expresses his belief that the winter change is effected not by the loss of the summer coat and the substitution of a new one, but by the actual change of colour in the existing fur; and he cites, in proof of this view of the subject, the case of the Hudson's Bay lemming, which, in Ross's first polar expedition, was exposed in its summer coat on the deck to a temperature of 30° below zero, and the next morning the fur on the cheeks and a patch on each shoulder had become perfectly white; at the end of a week the winter change was complete, with the exception of a dark band across the shoulders and prolonged down to the middle of the back. Like many other species of this genus, the ermine has the faculty of ejecting a fluid of a strong musky odour. Its fur is in great request; at one time it was one of the insignia of royalty, and it is still worn by the judges. Comparatively few ermine skins are at the present time exported from Hudson's Bay; but even so lately as 1850, 187,000 skins were received in England from that and other places. It is very common in many parts of England,

and is a great enemy to rats, mice, rabbits, and other small mammalia, not sparing even the pheasant and partridge. In consequence of its predaceous propensities it is much hated by gamekeepers and poultry owners; but the good which it does in destroying rats and mice is so great, that its occasional depredations on game are more than compensated.

Erythacus. (*See* Robin.)

Escalop, or **Escallop,** *es-kăl'-lup,* (Du. *schalp,* a shell,) a family of bivalve mollusks, the shells of which are deeply indented. In the centre of the top of the shell is a trigonal sinus, with a hinge consisting of elastic cartilage. In Her., the escallop-shell is a frequent bearing in the escutcheon, it having been the pilgrims' ensign in their expeditions to the Holy Land.

Esquimaux Dog, *es'-kwe-mo.*—This animal is rather larger than the English pointer, but appears less, on account of the shortness of its legs. It has oblique eyes, an elongated muzzle, and a bushy tail, which combine to give it a wild and wolfish appearance. The colour is generally a deep dun, obscurely barred and patched with darker colour. In the northern parts of America and the neighbouring islands, this animal is the only beast of burden. With a team of dogs harnessed to his sledge, the Esquimaux may scud over the snow at a rate of sixty miles a day, and this for several days in succession. The driver has no reins; but he has a long whip, and that answers every purpose, as the old and knowing dogs are always put to the fore, and know their way across the vast blank snow-fields with unerring correctness; and should the "shafters" prove refractory, a few cruel lashes with the reindeer thong quickly bring them to a sense of duty. It is a rule, however, among sledge-drivers to use the whip as seldom as possible; not, it must be confessed, from motives of humanity, but the chastisement of one of the team generally leads to considerable confusion; the dog struck at once falls to biting and mauling his next neighbour, and so the traces become entangled, and a general fight ensues, usually ending in the upsetting of the vehicle, and the loss of an hour in getting things in order again.

Ethmoid Bone, *eth'-moid,* (Gr. *ethmoides,* from *ethmos,* a sieve, and *eidos,* form, because it is perforated like a sieve,) in Anat., is one of the bones of the head, which is exceedingly light and spongy, consisting of many convoluted plates, which form a network like a honeycomb. It is somewhat cubical in form, and is situated between the two orbitary processes of the frontal bone, at the root of the nose. The olfactory nerves shoot down through the numerous small perforations of this bone to the organ of smell.

Eumenes, *you'-men-ees,* a genus of Solitary wasps, of which one species is known to exist in England. It builds small globular nests of mud, and fastens them to branches and twigs, especially those of the heath.

Eurystomus, generic name of the Dollar Bird.

Eustachian Tube, in Anat. (*See* Ear.)

Eustachian Valve, *u-stai'-ke-ăn,* (after Eustachius, the celebrated anatomist,) in Anat., is a membranous semilunar valve separating the right auricle of the heart from the inferior vena cava.

Ewe, the female of the sheep. (*See* Sheep.)

Exocœtus. (*See* Flying Fish.)

Exuviæ, *egs-u'-ve-e,* (Lat.,) a word applied to the cast-off skin of any animal, reptile, or shell-fish, which is "shed." The films of mucus thrown off by most mollusks and zoophytes must also be regarded as exuviæ. In insects, the whole integument is shed annually, several times in succession, the last moult taking place in the final transition state, from the pupa to the imago. In shell-fish, or crustacea, the external shell is usually cast yearly. The common snake, when confined, draws its skin off annually by means of pressure of the folds, and the rattlesnake is said to invert and draw off its own skin. In the more warm-blooded classes, the moulted feathers of birds and the hairs of various species of mammalia may be looked upon as exuviæ, or exuvial deposits; as also the small scales of what is termed scarf-skin, which are continually cast off from our own bodies.

Eye, *i,* (Ang.-Sax.,) the organ of vision, is one of the most wonderful and delicate portions of the human body. It is placed within a bony cavity, termed the orbit, pyramidal in form, with the base anteriorly, and directed a little outwards, and the apex backwards and inwards. The orbit contains the globe of the eye, with numerous muscles, nerves, vessels, fat, &c. The external appendages of the eye are the eyebrows, eyelids, and lachrymal apparatus. The eyebrows, or *supercilia,* are arches of hair covering the supra-orbital ridge of the frontal bone on each side, and extending from near the root of the nose to a little beyond the outer canthus of the eye. They serve to prevent the sweat from falling into the eyes, and to protect them against a strong light. The eyelids, or *palpebræ,* are two thin curtains which cover the eye, the one being inferior, the other superior. Where they join outwardly is called the *external,* and inwardly towards the nose, the *internal canthus.* The margin of the eyelids, which is cartilaginous, is called *tarsus.* Along the margin of each eyelid is a row of stiff hairs, termed *cilia,* or eyelashes, and which serve to keep external bodies out of the eyes, and moderate the influx of light. Within the lids, near their edges, are numerous glandular bodies, named after their discoverer, the *Meibomian* glands, which secrete an oily or mucilaginous fluid, that lubricates the eyes and lids, and facilitates their movements. The lachrymal gland is situated in a small depression of the frontal bone near the external canthus, and from it seven or eight canals issue, called the lachrymal ducts, and open on the internal surface of the upper eyelid; it secretes the tears, which then pass along the surface of the eye to the *puncta lacrymalia,* which are two callous orifices or openings, one in each lid, at the internal angle of the tarsus. From the lachrymal points the tears are conveyed by the lachrymal canals into the lachrymal sac, which is a membranous receptacle situated in the internal canthus of the eye. The nasal duct is a membranous canal, extending from the inferior part of the lachrymal sac downwards, backwards, and outwards, into the cavity of the nose. The lachrymal caruncle (*caruncula lacrymalis*) is a small fleshy body, of a red colour, composed chiefly of mucous follicles, and situated in the internal canthus of the eye. The globe or ball of the eye is composed of membranes or coats, humours, vessels, and nerves. The *membrana conjunctiva,* or conjunctive membrane, is a delicate mucous membrane, lining the internal parts of the eyelids, and covers the whole of the anterior part of the globe of the eye. The outermost coat of the eye is the sclerotic, (Gr. *skleros*, hard,) so called from its hardness. It is a strong, dense, white, fibrous structure, covering about four-fifths of the ball, and leaving a circular deficiency in front, which is occupied by the cornea. The latter, so named from its horny appearance, is the transparent covering in front of the eye, its edges being slightly overlapped by the sclerotic coat. Externally it is covered by the membrana conjunctiva, and internally it is in contact with the membrane of the aqueous humour. It is convex anteriorly and concave posteriorly, and is composed of several laminæ, or layers. The choroid membrane is of a black colour, and covers the internal surface of the sclerotic coat, with which it is loosely connected by connective tissue. Near its anterior margin it is thrown into numerous folds or processes alternately long and short, and which lie upon the edge of the lens and anterior portion of the vitreous humour: they are called ciliary *striæ* or processes, and conjointly the *corpus ciliare*. On the outer surface of the choroid are seen the ciliary nerves and long arteries; next come the veins, called, from the peculiar manner of their arrangement, *venæ vorticosæ;* next is the *tunica Ruyschiana*, composed chiefly of ramifications of minute arteries, forming a beautiful network; and next to this is the *tunica pigmenti*, composed of pigment-cells, usually of a hexagonal form, and secreting on its inner surface the *pigmentum nigrum*. The retina, or inner coat of the eye, consists of three layers of membranes, the outermost of which, in apposition with the choroid, is an extremely delicate membrane, termed the *tunica Jacobi*. The middle one, *tunica nervosa*, is in reality the expansion of the optic nerve, and terminates at the edge of the ciliary processes. The inner coat is the *tunica vasculosa retinæ*, which is vascular in texture, and contains several minute branches of the central artery of the retina. On the inner surface of the retina, at the back of the eye, and in a line with the axis of the globe, is a circular yellow spot, called the *limbus luteus*, in the centre of which is an apparent orifice, named, after its discoverer, the *foramen* of Sömmering. The *iris*, (Lat., a rainbow,) so called from its variety of colour in different individuals, may be regarded as a process of the choroid, with which it is continuous, although the two membranes differ in structure. It is a thin, flat, circular, membranous curtain, hanging vertically in the aqueous humour in front of the lens, and having a central orifice, termed the pupil, for the transmission of light. Its anterior surface is coloured variously in different individuals, and its inner surface is lined with a substance resembling the pigmentum nigrum, called the *uvea*. It divides the space between the cornea and the lens into two chambers, communicating freely with each other through the pupil. The anterior chamber is about a fifth larger than the posterior, and is lined with a membrane, which secretes the aqueous humour. The external edge of the iris, by uniting with the choroid and sclerotic coats, forms a grayish circle, termed the ciliary circle or ligament. The iris is muscular in structure, and has great power of contracting or expanding the pupil, so as to admit more or less light into the interior of the eyeball. In the anterior and posterior chambers is the aqueous humour of the eye, which serves to distend the cornea to allow the free motion of the iris, and to direct the rays of light as they pass through it. The crystalline lens is a transparent body situated behind and opposite to the pupil, while its posterior surface is received into a corresponding depression on the fore-part of the vitreous humour. In form it is double convex, the posterior surface being more convex than the anterior; and it is invested by a transparent membrane called the *capsule*, which contains also a small quantity of fluid, called the *liquor Morgagni*. The lens consists of concentric laminæ, formed upon a hard, firm nucleus, and becoming softer as they tend to the outer surface The vitreous humour, or *corpus vitreum*, lies in the concavity of the retina, occupying about four-fifths of the eye posteriorly, and being perfectly transparent. It is enclosed in the hyaloid membrane, which also sends numerous processes inwards, so as to divide it into a number of cells, and to equalise the pressure exerted on the different parts. It is penetrated by branches of the central artery of the retina. The eyeball is moved about in its orbit by six muscles, four of which are straight (*recti*) and two oblique—the superior and inferior. The four recti muscles have their origin at the apex of the orbit, and are inserted into the sclerotic coat near the cornea, above, below, and on either side. When acting together, they tend to fix and retract the eye; when separately, to raise, depress, or turn it to one side or the other. The superior oblique rises with the straight muscles, proceeds forwards to the upper edge of the orbit, where it passes through a small pulley of bone or cartilage, by which its direction is changed; and its course is then backwards, outwards, and downwards, to be inserted into the sclerotic coat. It serves to draw the eye downwards and outwards. The inferior oblique arises from a minute depression in the orbital plate of the superior maxillary bone, just within the margin of the orbit, at its lower part, whence it passes backwards, outwards, and upwards, to be inserted into the sclerotic at its posterior part. Its action is to direct the eye upwards and inwards. The optic nerves, or second pair, after uniting to form the optic commissure, in which some of the fibres of each nerve cross to the opposite side, separate, and enter the optic foramen at the apex of the orbit. They pass through the sclerotic coat on the inner side of and below the axis of the eye, then through the choroid, and spread themselves out, and are lost or terminate in the retina. Branches of the third, fourth, fifth, and sixth pairs of nerves also proceed to the eye, for regulating the movements, &c., of the different parts. In sight, then, the rays of light in passing through the cornea are converged, so as to pass through the relatively small pupil, and impinge upon the lens, which, by the convexity of its surface and its greater density towards the centre, serves to converge the rays, and to correct the aberration. They then traverse the vitreous humour, and strike upon the retina.

F.

FALCON. (*See* FALCONIDÆ.)

FALCONIDÆ, *făl-kon'-i de.*—Birds of this genus are distinguished from all other members of the family by the existence of a slight festoon on the lateral margin of the upper mandible, and also of an acute tooth on each side towards the apex. The wings are very long and pointed, the second and third quills being the longest; the tail is long and rounded; the tarsi of moderate length, stout and reticulated; the toes usually elongated, and terminated by long curved and acute claws. The tongue is fleshy, sloped, and canaliculated. The falcons proper are distinguished from the ger-falcon by a tooth more strongly defined on each side of the upper mandible, which, among the others, is a mere festoon; the lower mandible is also much more sloped at its point than in the true falcon. The falcons are found in all parts of the world, and the number of species is very large. Their flight is very swift, and their courage certainly greater than that of other rapacious birds. Their flight is performed by regular continuous beats, with little or none of that sailing motion which characterises the kites. In capturing their prey, whether in the air or on the ground, they descend perpendicularly upon it. Their food consists, for the most part, of small quadrupeds and birds; but many of them also feed partly on reptiles and insects. The nests of these birds are rough and bulky, composed of sticks and twigs placed in the hollows of rocks or in trees. The eggs are usually laid at the close of winter or very early in spring: they vary in number from three to six, and are generally speckled with red or brown. (*See* GER-FALCON, GOSHAWKS, &c.)

FALLOPIAN TUBES, *făl-lo'-pe-ăn*, in Anat., so called after the anatomist by whom they were first described, are slender tortuous canals, about four inches in length, proceeding from the upper angle of the uterus. Their inner, or attached extremity, is narrow and cordlike; but they soon begin to enlarge as they proceed outwards, and at length they bend backwards and downwards towards the ovary, about an inch beyond which they terminate in an expanded extremity, the margin of which presents a number of irregular processes, named *fimbriæ*, one of which, somewhat larger than the rest, is attached to the outer end of the corresponding ovary. They serve as ducts of the ovaries.

FALLOW DEER, (*Cervus Dama.*)—This animal may be distinguished from the stag by the spotted coat, the spread and palmated horns, and the smaller size. It seldom measures more than three feet high at the shoulder. Its colour is reddish brown, spotted with white; but there is a variety which is of a nearly uniform dark brown. This latter is a native of Norway, and was brought to England at the time of James I. The manners of the fallow deer resemble those of the stag; but it is less delicate in the choice of its food, and browses closer. It attains full growth at the age of three years, and is said to live twenty years The fallow deer's native country is the south of Europe and the south-western part of Asia. The skin of this animal furnishes a valuable leather, and the horns, like those of the stag, are manufactured into knife-handles, &c. The shaving of the horns has been used in the manufacture of *ammonia*, popularly known as *hartshorn*. (*See* DEER.)

FAN SEA, a kind of coral, known by the name of Gorgonia, and being fixed, and plantlike, spreading like a fan, and having a horny axis, and without joints.

FARM ANIMALS.—These animals may be divided into two classes,—first, those which are used for draught or for cultivating the soil; and, secondly, those which are bred and reared upon a farm, either for dairy purposes or for the object of being sold at a profit. For draught and ploughing purposes, the horse is more employed in England than in any other country; oxen are much used among other nations. The best English plough horses come from Suffolk. The quicker action of the horse makes its work more productive than that of other animals. Amongst the farm animals which are bred for the purpose of sale, the most numerous are the sheep. The sheep is the easiest to feed of all animals, and derives the greatest benefit from what it consumes; while it gives the most active and rich manure to the land. For this reason, the English farmer makes it his object to keep a large number of sheep. England has always possessed a great many sheep; the British isles were celebrated for this even in the time of the Romans. There are, at the present day, three principal breeds in England—the Leicester, the Southdown, and the Cheviot. (*See* SHEEP.) With regard to cattle, the principal objects of the English farmer in their rearing are the milk and meat. The milch-cow race, *par excellence*, of the British empire, came originally from the Channel Islands. The breed usually goes under the name of Alderney. The Ayrshire cow, which first came into notice about sixty years ago, is the Alderney cow's rival. Ireland possesses two races of milch cows. The first breed of cattle improved in the midland districts was the long-horned. It is now pretty generally abandoned. Among the improved breeds of long standing, the short-horns of Durham stand first: they first gained a reputation about 1775. Since that time, the race of improved short-horns has spread through the United Kingdom, and was some time ago introduced into France. The Hereford and Devon breeds are reckoned next to the Durham in excellence. The other farm animals of importance are pigs and poultry. (*See* PIGS, POULTRY.)

FAUNA, *faw'-nă*, a term employed by naturalists to express the whole of the members of the animal kingdom living in a particular district, or at a particular time. Thus all the animals living in Great Britain constitute the British fauna. Those inhabiting the land form the terrestrial fauna, and those inhabiting the seas, the marine fauna. It is often applied, collectively, to all the animals of the world, the extinct species constituting the fossil fauna, and the living species, the recent fauna. The word is derived from the Fauni, who were supposed to be the patrons of wild animals.

FAWN, an appellation given to a buck or doe of the first year. (*See* DEER.)

FEATHERS, *feth'-ers*, (Ang.-Sax.,) the general name for the exterior covering of birds. They consist of the *quill*, the shaft, and the vanes. The quill is a hollow semi-transparent horny cylinder, by which the feather is attached to the skin. It combines strength with lightness in a very extraordinary manner. The cavity of the quill contains a series of conical capsules united together by a central pedicle, forming the membranous remains of the original formation-pulp. The *shaft* is quadrilateral, with a smooth convex surface: it contains a white, dry, and very light pith. The *vanes* are subdivided into two parts—the barbs and the barbules. The sides of the shaft are covered with the barbs, and each barb forms of itself a small shaft, which is covered in a similar manner with little barbs on each edge. Those barbules are so firmly bound to each other, that although in reality separate, they seem to adhere. The feathers of birds are changed at periodical intervals. This is called "moulting." Feathers vary in their size, form, and function, and in most cases are accompanied by an accessory plume, which is usually in the form of a small downy tuft. In high northern latitudes, the inhabitants wear the skins of some birds with the feathers on, as clothing. In Greenland, clothes made with the skins of eider-ducks are worn with the feathers inside. The ancient Mexicans made pictures with the coloured plumes of humming-birds, after the manner of mosaic. Feathers make a considerable article of commerce. The feathers of the ostrich have been held in high estimation from the times of antiquity, and have been used as ornaments for the fans and head-dresses of ladies, the helmets of warriors, and for gay processions. Many parts of England and Scotland supply feathers for beds, and an inferior sort is imported from Ireland. The finest feathers used for this purpose are those of the eider-duck, which is obtained in Greenland, Iceland, and Norway. Very fine feathers, especially for quills, are obtained from Hudson's Bay. Down, or the first covering of young birds, is also an article of commerce. The down of the swan is brought from Dantzic, together with a large quantity of superior feathers. In 1845, a duty, which had, up to that time, been levied on feathers, was repealed. (*See* BIRDS.)

FEATHER-STAR. (*See* COMATULA.)

FELIDÆ, *fe'-le-de*, (Lat. *felis*, a cat,) a family of the Cat kind, of the order Carnivora, in which the destructive organs reach the highest perfection. This family is by some naturalists said to include the dogs, hyænas, wolves, and smaller carnivora; but the system generally adopted is to include among the Felidæ only the cats, lions, tigers, leopards, and lynxes. In these animals the head is short and almost rounded in its form. The principal instruments of the destructive energy of these animals are the teeth and claws. Their dental formula is as follows:—

$$\text{Incisors}\,\frac{6}{6};\ \text{canines}\,\frac{1-1}{1-1};\ \text{præ-molars}\,\frac{4-4}{2-2};\ \text{molars}\,\frac{2-2}{1-1}$$

The canines are long, sharp, compressed, and cutting; the præmolars are furnished with two roots, compressed, pointed, and serrated; the flesh-teeth, or true molars, are very large, sharp-edged, and terminated by two or three points; and behind the flesh-tooth in the upper jaw there is a small tubercular tooth, which is wanting in the lower. In addition to this formidable apparatus of cutting-teeth, the tongue in these animals is covered with small recurved prickles, by which they can detach from the bones of their prey every particle of flesh. The palate is soft, and that part of the tongue which corresponds with it is smooth; as it advances forward, it is covered with large soft papillæ directed backwards; then there are four large fessulate papillæ, anterior to which the simple conical papillæ continue increasing in size to near the tip of the tongue. These papillæ are armed with the strong cuticular spines before mentioned. The five toes of the anterior and four toes of the posterior extremities of the cats are armed with very strong, hooked, sub-compressed, sharp claws, which are preserved from being blunted by a peculiar arrangement of the phalanges. For this purpose the claw-joint of each toe is drawn back by ligaments attached to the penultimate joint, until it assumes a perpendicular position, when the claw which it supports is completely retracted within a sort of sheath, and is entirely concealed by the fur. When, however, the animal springs upon its prey, the tendons of the flexor muscles of the toes implanted into the opposite surface of the phalanx overcoming the elasticity of the retractile ligaments, push forward the claws, and they are ready to be buried in the flesh of a victim. The lower surface of the foot is furnished with thick ball-like pads of the epidermis, upon which the animal walks; and these are the cause of the peculiarly noiseless tread which is characteristic of all the members of this family. It will be seen, on reference to any members of the cat tribe, that the mode of walking adopted by these creatures is different from that of man, monkeys, or bats. The weight of the body rests only on the toes, and not on the entire foot. The manner of walking is termed "digitigrade," from the Latin words *digitus*, a finger, and *gradus*, a step. Cats hunt in the gloom, and consequently, while escaping observation, require every ray of light that can be made available. The pupil is a long vertical fissure; but this only obtains among the smaller genera; for in all the Felina that surpass the ocelot in size, the pupil again assumes a round form. "On the top of the skull there runs a tolerably high bony crest, which reaches its greatest elevation at the very back of the head. This bone-ridge is intended for the attachment of the powerful muscles which raise the head and enable the animal to perform its prodigious feats of strength. Pausing awhile, and directing our attention to the anterior of the skull, a curious internal ridge of bone is seen, which rises to some little height and separates the two great divisions of the brain from each other. In the cat tribe, this ridge arises entirely from that part of the skull which is known by the name of the 'parietal bone;' but in other carnivorous animals the 'occipital bone' is the principal source of this structure. The use of the bony ridge is not quite certain; but it seems likely that it may play an important part in guarding the brain from the severe shocks which must be occasioned by the movements of the animals when they leap upon their prey. Reverting to the exterior form, and passing from the head to the neck, we find that the first two vertebræ partake of a similar enlargement to that which has already been observed on the back of the skull. The vertebræ which is nearest to the head, and is called the 'atlas,' is broad and strong, and spreads laterally; while the second, or 'axis,' is long, and is developed upwards into a very powerful crest. The ribs are beautifully formed, and placed rather widely apart, giving plenty of room for the heart and lungs to perform their duties effectually. The vertebræ that fill the space between the ribs and the hip-bones are very large, and so exquisitely jointed together that they unite a graceful flexibility of movement with great muscular power."—(*Rev. J. G. Wood.*) With regard to the digestive organs of the Felidæ, the salivary glands are small, as might be expected where it can hardly be said that mastication is exercised. In the case of the lion, the stomach is divided, by a slight contraction in its middle, into two portions. As in most of the family, its muscular coats are very strong. Blumenbach observes, that in most carnivorous quadrupeds, particularly those of a rapacious nature, the stomach bears a considerable resemblance, on the whole, to that of the human subject. "In the Carnivora, the stomach, which is of a cylindrical form, has no culs-de-sac; the œsophagus opens at its anterior extremity, and the intestine commences from the posterior; so that everything favours a quick passage of the food, which receives no mastication, and is retained a very short time in the stomach. The intestine has no valves, is small in diameter, but muscular, and the whole canal, when compared with the body, is extremely short, being as 3 or 5 to 1. It is worth noticing, that in the domestic cat they are as 5 to 1; but in the wild cat they are only as 3 to 1."—(*English Cyclopædia.*) The Felidæ are distributed in all parts of the world, with the exception of Australia, but principally in the warmer regions, where alone the larger species are met with.

Femoral, *fem'-o-răl*, (Lat. *femur*, the thigh,) in Anat., is applied to parts of, or connected with the thigh; as, the femoral bone, or *os femoris;* the femoral artery, &c. (*See* Thigh.)

Fennec, *fen'-nek*, (*Vulpes zaarensis; Canis Zerda* of Zimmermann,) belonging to the Carnivora, and chiefly found in Nubia and Egypt. This animal, which has given rise to much controversy, is generally placed by the French zoologists among the foxes; but the observations of Mr Yarrell led him to pronounce decidedly that the fennec appears to him to belong to the genus Canis, the osteological part of its structure closely resembling that of the dog, and the pupil of the eye being circular. The fennec is of slight build, and seldom measures more than a foot in length, exclusive of the tail, which is fox-like and bushy, and measures eight inches in length. Its colour is very pale fawn, with a slight touch of jetty black at the base and extremity of the tail. Although without doubt a carnivorous animal, the fennec is especially fond of the fruit of the date-palm, and is said to be able, and frequently to exercise his ability, to climb the lofty trees, and gather the dates. Bruce, who claims the honour of introducing the fennec to zoological science, asserts that it builds its nest in trees. In later times, however, it has been certainly ascertained that it burrows like the foxes. It is of nocturnal habit.

Feræ, *fe'-re*, (Lat. *ferus*, wild,) a term employed by Linnæus to distinguish the order of mammalia which subsist more or less exclusively upon the flesh of other animals. They have three rows of teeth,—incisors, canines, and molars; unguiculate extremities, without an opposable thumb on the fore-foot, but with the power of rotation in the fore-arm. The order of Feræ corresponds with the Insectivora, and the plantigrade, digitigrade, and pinnigrade Carnivora of Cuvier's Carnassiers. (*See* Carnivora.)

Fer-de-Lance, *fare'-dĕ-lanse*, a venomous serpent allied to the rattlesnake, and known scientifically as *Craspedocephalus lanceolatus*. It is found in Brazil, and is fond of haunting sugar plantations. It is, however, very useful in spite of its venom, as it keeps the plantations nearly free from rats, which would otherwise swarm in such good quarters, and spoil the whole crops.

Ferret, *fer'-ret*, (Du. *vret*, Fr. *furet*,) (*Mustela Furo*, Linn.) This well-known animal is a native of Africa, but domesticated in Europe. Its habits are similar to those of the weasel, but more bloodthirsty. Its length is about fourteen inches, exclusive of the tail, which measures about five and a half inches; snout sharp; eyes red and fiery; colour commonly pale yellow, but sometimes partaking of all the colours usual in the weasel kind. In slightness of body and shortness of leg it likewise resembles the weasels. Ferrets are chiefly used to hunt rabbits. Courageous, however, as is the ferret, there is not more than one in ten who is a really good "ratter," or, indeed, that can be induced to enter a rat-burrow. The same timid animal, however, will, without invitation, scamper into a rabbit burrow; and for this very good reason, that whereas, especially if there be many litters of young rats in the colony, the old animals will show desperate fight with the intruder; the rabbits will never, on any chance, turn on it, but rush headlong away. In the pursuit of this latter sport, it was the custom in olden time to *sew* the lips of the ferret together before it was turned into the rabbit burrow, and so prevent it doing anything but scare them out of the hole, and into the hands of the watcher at the mouth of it. In old books of "sport," there are elaborate instructions as to how the ferret should be held while his lips are being sewn, together with the sort of needle to be used. The modern system, however, is to muzzle or "cope" the ferret. This is accomplished by the use of two pieces of soft string, one of which is passed round the neck, and the other under the jaws, the four ends meeting at the back of the neck, and being there tied. Cold is fatal to the domesticated ferret. It breeds twice a year, the production ranging from six to nine young ones at a litter. Sometimes the female will eat up her young, and in that case she is likely to litter three times in the year. The period of gestation is six weeks. The young are born and continue blind during an entire month, and at three months old are considered fit for "work."

Fetlock, *fet'-lock*, (Ang.-Sax. from *footlock*,) a tuft of hair which grows behind the pastern-joint of most horses. Horses of diminutive size, however, have hardly any tuft.

Fibula. (*See* Leg.)

Fiddler Crab, a popular name given to the crabs of the genus Portunus, because, in swimming, they work the flattened hind legs as a fiddler works his elbow when playing a very rapid piece.

Fieldfare, *feeld'-fair*, (*field* and *fare*, from Sax. *faran*, to go,) (*Turdus pilaris*, Linn.,) a migratory bird, appearing among us about the beginning of November, and departing at the end of April. They seldom breed in this country. It is about ten inches in length, and of the following colours:—Head, hind neck, and wings, gray; fore part of the back, chestnut; space before the eyes, brownish black; foreneck and breast, reddish yellow; over each eye, a whitish line; feathers tipped with a brownish triangular spot; those of the sides with large dusky spots, and margined with white; lower wing-coverts and axillary feathers, pure white. In Poland, Russia, and Austria, it is found throughout the year. It builds its nest in lofty trees, and feeds on worms and various berries. It is closely allied to the common thrush, and looks like a magnified specimen of that bird. Sometimes it assembles in large flocks, and in the winter time may be shot without much difficulty, though it is a wary and shy bird.

Field Spaniel.—This class of dog has very long hair in some parts; it is generally white, with large brown, liver-coloured, or black spots of irregular size and shape. The nose is sometimes cleft, and the ears are very long and pendulous, and covered with long hair like its body. The race of spaniel dogs was imported originally from Spain, whence their name. The field spaniel is used for shooting in field sports, like its congener, the *setter*.

Filaria, *fe-lai'-re-ă*, (Lat. *filum*, a thread,) a genus of parasitic entozoa, common to large and small animals, and infesting even certain of the mollusca. Of this family, the most inimical to the comfort of man is the Guinea-worm, (*Filaria medinensis*,) which, in hot climates, insinuates itself under the skin of the lower members, causing excruciating pain. It has a slender and thread-like body, and sometimes attains a length of six feet. It is met only in certain portions of the torrid and temperate zones in Africa and Asia, and is especially frequent on the African coast.

File Fish. (*See* Balistes.)

Filly, *fil'-le*, (Ang.-Nor.,) a name applied to a young mare before it has reached its third year. For further information, see article Horse.

Fin, *fin*, (Sax. *finn*,) in Ichth., a flat expanded organ projecting from the bodies of fishes, and used as an instrument of locomotion in the water. The fins of fishes are supported by elongated filamentary bones or rays, by the number and nature of which the naturalist is able to distinguish the various groups. Many species of the whale tribe possess an immovable fin upon the back, composed merely of a reflexion of integument over a mass of dense and ligamentous cellular membrane. The tail fin has the same structure, but is moved by the action of muscles upon the caudal vertebræ, which are continued through the middle part. In works on ichthyology, a system of notation, founded upon the number of fin rays, is employed. Thus the number of fin rays in the perch is expressed in the following manner:—D. 15, 1 + 13; P. 14; V. 1 + 5; A. 2 + 8; C. 17. This denotes that D., the dorsal fin, has in the first fin 15 rays, all spinous or bony; in the second fin, 1 spinous and 13 soft; P., the pectoral fin, has 14, all soft; V., the ventral fin, has 1 spinous and 5 soft; A., the anal fin, has 2 spinous and 8 soft; and C., the caudal fin, 17 rays.

Finches, *fin'-tshes*, (Sax. *finc*,) a family of birds belonging to the order Passeres, and the division Conirostres, and known by the general name of *finches*. According to Mr Vigors, this family embraces, in addition to the Alaudinæ, or larks, to which the buntings, or Emberizinæ, seem nearly allied, the greater part of the Linnæan Fringillidæ, with the Linnæan Tanagrinæ, (tanagers,) which approach these in their external characters and in their habits. As far as has hitherto been ascertained, none of the finches are of large size, and in their habits and general appearance there is a strong likeness. For the most part they are hardy birds. Their food chiefly consists of grain, worms, and insects. The characteristics of this family of birds are,—beak straight, longer than deep, conic and pointed; mandibles nearly equal, cutting edges entire, forming a straight commissure; nostrils basal, lateral, oval, partly hidden by the frontal plumes; wings with the first quill-feather longer than the fifth, but a little shorter than the second or third, which are equal, and the longest in the wing; legs with the tarsi of moderate length; toes divided, and adapted for hopping and perching; claws curved and sharp.

Fire-flies, a name given to many insects which have the property of emitting a phosphorescent light. Most of them are beetles, belonging to the Elateridæ, *q. v.*

Fish, *fish*, (Sax. *fisc*,) (*Pisces*,) a name applied to animals exclusively aquatic, and occupying the fourth and lowest station of the section Vertebrata. The head is large, and set upon the neck without the intervention of any distinct neck; the body is usually of a spindle shape, tapering gradually towards the extremity; and the surface is usually smooth, without any irregularities which might impede the motion of the creature in its native element. In its general form, the body is usually rounded, or slightly compressed at the sides; sometimes this flattening proceeds to a much greater extent, so that the animal presents the appearance of a broad band, or oval disk, of which the edges correspond with the dorsal and ventral surfaces; in other cases, the flattening takes place from above downwards, producing a disk-like body, of which the upper and lower surfaces are dorsal and ventral. A fish may be shortly defined as an animal breathing through the medium of water, by means of gills; and in giving it our consideration, this latter apparatus is the most important feature presented. It is situated on each side of the neck, and consists of numerous laminæ fixed on arches. These laminæ are covered with innumerable blood-vessels, and are so constructed as to present a considerable surface to the water, so that the blood may receive a sufficient portion of the oxygen contained in that element. As the water in contact with the gills becomes deteriorated, it is necessary that a constant current be caused to flow over them. In most fishes this is effected by their taking water in at the mouth, and expelling it at the gill-covers. The blood, which is constantly sent from the gills to the heart, is distributed, by means of the arteries, to every part of the body, whence it returns to the heart by means of the veins. Animals of this order are for the most part furnished with an air-bladder in the interior of the body, which, as it is often connected with the œsophagus by a tube, must be regarded to a certain extent analogous to the lungs of the air-breathing vertebrata. This sac or air-bladder, however, has nothing to do with respiration; it receives blood from the arteries, and returns it into the veins, and the air which it encloses is probably derived from this fluid. By the dilation or compression of this sac, the specific gravity of the fish is governed, and, acted on by a curious muscular apparatus, renders its possessor lighter or heavier than the surrounding element. The limbs of the fish are formed into fins; the fore-legs constituting what are termed the pectoral fins, and the posterior extremities, the ventral. Besides these, ordinary fishes are furnished with one or two dorsal fins, an anal fin, and a caudal fin, or tail. In some fishes, the dorsal or median fins are continuous round the whole posterior portion of the body; and this is the condition in which these organs first make their appearance during the development of the embryo in all fishes, the subsequent changes which take place in the arrangement of the parts being due to the unequal development of the bony rays, which support and stretch the membrane of which the fins are composed. The pectoral fin, in all fishes, consists of the same parts as the anterior limbs of any other vertebrated animal. Concealed within the skin, immediately behind the branchial openings, is found a bony circle, composed of several pieces, representing the shoulder-blade, with the coracoid bone and clavicle. This supports the bones of the arm, which are usually very short, and bear a series of carpal bones at their extremity; the latter supporting a number of short cylindrical joints, whence the rays of the fin take their rise. The internal supports of the ventral fins never present such a close resemblance to the pelvis of the higher vertebrata as do those of the pectorals to the scapular arch. When situated in their normal position in the abdomen, they always consist of cartilaginous or bony pieces, lying freely in the muscles, and quite unconnected with the vertebral column; but when the fins are advanced from this position to the neighbourhood of the pectorals, their internal supports are attached to the scapular arch of the latter members. The principal organ of motion is the caudal fin, or tail: by this it is propelled. The dorsal and ventral fins serve to balance it, and the pectorals to arrest its progress when required. The bones of fishes are of a less dense and compact nature than in the higher orders of animals, and always remain in an isolated state, similar to that of the embryo of the mammalia. The skeleton may be divided into four chief parts,—the vertebral column, the head, the respiratory apparatus, and the limbs. The vertebral column consists of vertebræ which are concave at each end, and pierced in the middle; and when joined together, the hollow space between each two is occupied by a gelatinous substance, which passes from one space to the next through the hole in each bone. This hole is usually very small; but in some of the chondropterygians it is so large that the bodies of the vertebræ are mere rings. To the vertebræ are attached the ribs: in fact, the ribs are the main support of all the other bones. The head varies more in form than in any other class of vertebrate animals. The same bones as those found in other oviparous animals are almost always traceable. The upper jaw consists of maxillary and intermaxillary bones. In the greater number of fishes, the intermaxillary bones constitute the chief portion of the upper jaw, the maxillary bones being placed behind, and parallel to them. The lower jaw is composed generally of two bones on each side, the dental portion in front, and the articular portion behind. The form of the body is for the most part such as mechanical principles teach to be best adapted for moving with least resistance through a liquid medium. The surface of the body is either smooth and lubricous, or is covered by closely imbricated scales, rarely defended by bony plates, or roughened by hard tubercles, still more rarely armed with spines. The central axis of the nervous system presents but one partial enlargement, and that of comparatively small size, at its interior extremity, forming the brain, which consists of a succession of ganglionic masses, most of them exclusively appropriated to the function of a nerve of special sense. The power of touch can be but feebly developed in fishes. The organ of taste is a very inconspicuous one; the chief function of the framework supporting it, or the hyoidan apparatus, relating to the mechanism of swallowing and breathing. Of the organ of hearing, there is no outward sign; but the essential part, the acoustic labyrinth, is present, and the semicircular canal, largely developed within the labyrinth, is without cochlea, and is rarely provided with a special chamber, but is lodged, in common with the brain, in the cranial cavity. The eyes are usually large, but are seldom defended by eyelids, and never served by a lachrymal organ. The alimentary canal is commonly short and simple, with its divisions not always clearly marked, the short and wide gullet being hardly distinguishable from the stomach. The pancreas, for the most part, retains its primitive condition of separate cæcal appendages to the duodenum. The heart consists essentially of one auricle and one ventricle, receiving the venous blood, and propelling it to the gills, whence the circulation is continued over the entire body in vessels only, which are aided by the contraction of the surrounding muscular fibres. The blood of fishes is red, but cold, and is rarely elevated above the temperature of the surrounding element. The sexes of fishes, excepting the sharks and rays, offer no very decided external characters by which they may be distinguished. The respiratory organs, however, occupy more space in the males than in the females; and, on the other hand, the abdomen is larger in the females than in the males. The fecundity of fish is very wonderful, as the following table will show:—

FISH.	Weight.		Weight of Spawn.	Number of Eggs.
	oz.	dr.	grs.	
Carp, ...	25	5	2,571	205,109
Codfish, . . .	...		12,540	3,636,760
Flounders, . .	24	4	2,200	1,357,400
Herrings, . .	5	10	480	36,960
Mackerel, . .	18	0	1,223½	546,681
Perch, . . .	8	9	766½	28,323
Pike, ...	56	4	5,100½	49,304
Roach, . . .	10	6½	361	81,586
Smelt, . . .	2	0	149½	38,278
Sole, ...	14	8	542½	100,362
Tench, . . .	40	0	...	383,252
Lobster, . .	...		1,671	21,699

The salmon is far more productive than any of these; the ovarium of one female salmon will produce 20,000,000 eggs.—Ref. *English Encyclopædia*, Dallas; and the works of Jesse, Owen, Yarrell.

Fishing-Frog. (*See* Angler-Fish.)

Fissirostres, *fis-se-ros'-treez*, (Lat. *findo*, I cleave; *rostrum*, a beak,) the name of a tribe of birds, consisting of the swallows, swifts, and goatsuckers. They are distinguished by having the bill short, broad, depressed, slightly curved, without any tooth, and so deeply cleft as to give peculiar wideness to the gape; a structure of great use to birds which prey so exclusively on insects taken on the wing. On account of the food on which they subsist, all the Fissirostres migrate from northern countries towards the close of autumn, and return again in spring. Like the raptorial order, or birds of prey properly so called, the fissirostral tribe is capable of a binary division into diurnal and nocturnal species.

Fissurella, *fis-sŭ-rel'-la*, a genus of univalve mollusks, sometimes called Keyhole Limpets, because they have an aperture on the apex of the shell shaped something like a keyhole.

Five-fingers. (*See* Star-fishes.)

Flamingo, *flă-min'-go*, (Sp.-Port. *flamenco*,) (*Phœnicopterus ruber*, Linn.)—This bird inhabits the warm climates of Asia, Africa, and America, and is one of the most remarkable of aquatic birds. Its height is about four feet. In its first year it is of one colour,—grayish white; in its second year, the white is purer, and the wings are tinted rose-colour; in the third year it attains its full plumage,—wings roseate, back deep scarlet, and quill-feathers jet black; and as the bird grows older, these colours increase in tone. The neck is slender and of great length, equalling that of the legs, which are about two feet. The head is small and round, and furnished with a bill nearly seven inches long, which is higher than it is wide, light, and hollow, having a membrane at the base, and suddenly curved downwards from the middle, as if broken. The lower mandible, which is the larger, is so adjusted as to fit the angle with its edges, its under surface being greatly arched downwards. The edges of both mandibles are serrated. In operation, these mandibles act like a strainer, allowing the water to escape, but retaining any sort of prey the flamingo may capture. Its food consists of small fish and water insects, which it fishes up by means of its long neck, turning its head in such a manner as to take advantage of the crook in its beak. In searching among the mud at the bottom of the water for food, the upper, not the under, mandible is applied to the ground. In that situation the inferior mandible is uppermost, and by its motion works the disturbed water through the two. The tongue is large and fleshy, betokening an acute sense of taste. The ancient Romans considered a dish of flamingo tongues to be one of their greatest delicacies. A few hours spent in watching the flamingoes at the Zoological Gardens will dispel many prevalent errors respecting the habits of the bird, among which may be noticed the assertion that it never sits down. There the sitting attitude is quite common, and when resting on the ground, with legs bent under it, the bird can pick up an object from the ground some inches behind its tail.

Flea, *fle*, (Ang.-Sax.)—The proper position of this insect in entomological classification has been the subject of much dispute. By many authorities, including the distinguished names of Latreille, Kirby, and Spence, the fleas are considered to form a distinct order; the former naturalist treating of them under the order Siphonoptera, and the latter, the order Aphaniptera. By others, they have been arranged with the order Diptera, but with little reason; for in certain important characteristics they widely differ from them. It has been truly remarked, that "it is highly probable, when this group is better known,—when the numerous insects allied to the fleas are more common in our cabinets, it will be found that they do not constitute an order by themselves, but are aberrant forms of the other well-established orders. In these, there is a certain degree of uniformity, as regards number, variety of habits, &c., which cannot but lead us to doubt the validity of the so-called orders, containing only one or two genera and but few species, such as the present orders." The curious structure of the flea has doubtless greatly contributed to perplex and hinder those who have sought to find its correct genera. The most familiar species is the common flea, (*Pulex irritans*,) which is, unfortunately, very numerous in this country. The body of the flea is protected by a horny covering, composed of segments, which are very well defined,—those of the thorax are always disunited. Its mouth is suctorial, formed of three pieces, enclosed by two articulated laminæ, which, when united, form a cylindrical or conical proboscis, the base of which is protected by two scales. Although, to all appearance, apterous, the flea possesses the rudiments of wings, which are four in number, in the form of horny plates, on the sides of the meso- and meta-thoracic segments, the hindmost pair being somewhat larger than the other. Its head is small and compressed, on each side of which is a small round eye. The most singular organs of the flea are the two fine-pointed mandibles of the mouth, which, in combination with another sharp organ, (supposed to represent the labrum,) constitute the powerful attacking instrument of the insect, which permits it to pierce the hard skin of its victim with remarkable facility. Situated on the anterior part of the head, are two four-pointed organs, which were formerly supposed to be the antennæ, but now more correctly considered to be the maxillary palpi. The antennæ are very minute, and concealed beneath a rake-like plate on the sides of the head behind the eyes. The legs are very strong, more particularly the hinder ones, which are used by the flea in its extraordinary leaps. This insect undergoes a complete metamorphosis; the larva is an elongated footless grub. On arriving at the pupa state, which occupies about twelve days, it encloses itself in a silken cover, and in a few days assumes its mature condition. Besides *Pulex irritans*, there are several other species peculiar to different animals. The dog possesses such a parasite, (*P. canis*;) also the martin, (*P. hirundinis*;) the mouse, (*P. musculi*;) and the mole, a large variety, (*P. talpæ*.) A great pest of the West Indies and South America is the chigoe or jigger. (*See* Chigoe.)

Flea, Water. (*See* Daphniadæ.)

Flesh, *flesh*, (Sax. *flæc*,) a compound substance, constituting a large portion of every animal; consisting of the softer solids, as distinguished from the bones and fluids. As a general appellation, it may be taken to include the blood-vessels, nerves, cellular tissue, &c. (*See* Muscle, Tissue.) Chemically considered, flesh consists of fibrin in a coagulated form, permeated by at least three times its weight of water and fluid, consisting partly of blood and partly of substances secreted from it. The soluble matters consist chiefly of albumen, the soluble salts of the blood, two animal principles, called kreatine and urorite, and phosphoric, lactic, butyric, acetic, and formic acids. The salts consist of the phosphate of potash, magnesia, and lime, and a small quantity of chloride of sodium.

Flesh-fly belongs to the general order of Diptera in the classification of the insect tribe, and the name by which it is distinguished in this order is *Musca vomitoria*, in contrast to the common house-fly, or *Musca domestica.* The insect is termed *flesh-fly*, from the fact of its depositing its eggs in fleshy viands, in which the larvæ are hatched. It is generally larger than the common house-fly, and its wings indeed are sometimes nearly three-quarters of an inch in expanse. It is distinguished by a proboscis, always very apparent, membranous, and bilabiate, generally bearing two palpi, and capable of being withdrawn entirely within the oral cavity: it also has a sucker of two pieces; the antennæ in a plate with lateral setæ.

Flexor, *flek'-sor*, (Lat. *flecto*, I bend,) in Anat., is the name of certain muscles whose office it is to bend the parts into which they are inserted. The antagonistic muscles are termed extensors.

Florikan, *flor'-ik-an*, a name given to several Indian bustards.

Florisuga, a genus of humming-birds, known by the arched bill, and the short, rounded tail, beyond which the long tail coverts project.

Flounder, *flown'-der*, (Swed. *flundra*,) (*Pleuronectes flexus*,) a flat fish very similar to the plaice, but smaller, and of more obscure colour. It is very common about the British coast, and is found in the Northern, Baltic, and Mediterranean seas. Its body is covered with very small scales, and along its back runs a row of sharp spines.

Flustradæ, a family of infundibulate molluscoids, having the polyzoary flat, flexible, leafy, erect, and covered with many minute cells. Popularly they are known as Sea-mats. On account of their peculiar scent they are sometimes called Lemon-weeds.

Fly, *fli*, (Sax. *fleoge*,) a name applied almost indiscriminately to all insects possessing wings; by many, however, restricted to the various species of dipterous insects. The fly is characterised as possessing a pair of veined and membranous wings, with two movable bodies called balancers, (*halteres*,) placed a little behind them. The mouth is formed of between two and six setaceous pieces of scaly texture, and these pieces are either enclosed in a proboscis-like sheath, or covered by one or two laminæ, which form it. The head is globular or hemispherical. The mouth is only formed for transmitting fluids, and is consequently very delicate in structure. The sucker performs the part of a lancet, and pierces the envelope of vegetable or animal fluids, in order to allow of the fluid itself being transmitted up into the mouth of the insect. The antennæ are united in front, and are approximate at the base. Above the true wings of the insect, and a little behind them, are the balancers, or *halteres:* these are almost membranous, and are furnished with two little knobs at their extremities, which are capable of dilation. The legs of this class of insects are long and slender; and the feet, it is well known, are furnished with skinny palms, to enable them to stick on glass and other smooth bodies by means of the pressure of the atmosphere.

Fly-catchers, *fli-kătsh'-erz*, (*Muscicapidæ.*)—This very numerous family is widely diffused throughout both the eastern and western continents. As their name implies, they prey on insects, which they seize in mid-air. They have the beak horizontally depressed, and armed with bristles at its base, with the point more or less decurved and emarginated. The value of the insectivorous family of birds to man is incalculable. As Buffon truly says: "Vain would be the efforts of man to destroy or banish the clouds of flying insects by which he would be assailed. Man and quadrupeds cannot defend themselves against them. They attack with their stings; they oppose the progress of cultivation, and devour the useful productions of the earth. They infect with their excrement, or their eggs, all the provisions which are necessary to be preserved. Thus we find that the beneficent birds are not even sufficiently numerous in such climates, where, nevertheless, their species are by far the most multiplied." One of the best types of fly-catchers is that presented by the tyrant fly-catcher, (*Muscicapa tyrannus*, Briss.) This bird is peculiar to America. It is eight inches in length, and fourteen in extent of wing. The general colour of the upper parts is dark bluish-gray, inclining to dull slate-black on the head, of which the central feathers along the crown form a gorgeous orange patch. It builds its nest on branches of trees; it is a rather bulky structure, composed of twigs and wool, or tow and cotton, and is very thick and snug. It scarcely deserves its ugly appellation, as it is only at those periods when its mate is attached to the nest by care for her little brood, that this fly-catcher is more fierce or tyrannical than any other. At such times, however, it cannot be denied that his conduct is rather outrageous. No matter the species of bird, no matter its size or strength, it is sufficient that it approaches any way near the tyrant's nest to excite his jealous rage, and out he sallies bent on instant satisfaction. It is said that eagles and hawks may not with impunity approach this bird's nest, made sacred by his fledglings, and that, darting up into the air, it will launch down on to the back of its enemy, and there anchor in such a way as to make it a difficult matter to dislodge him. Only two small species of this tribe are found in this country. The European species are distinguished from any other by having much more slender bills, with shorter bristles at the gape.

Fly, Dragon. (*See* Dragon-fly.)

Flying Dragon. (*See* Dragon.)

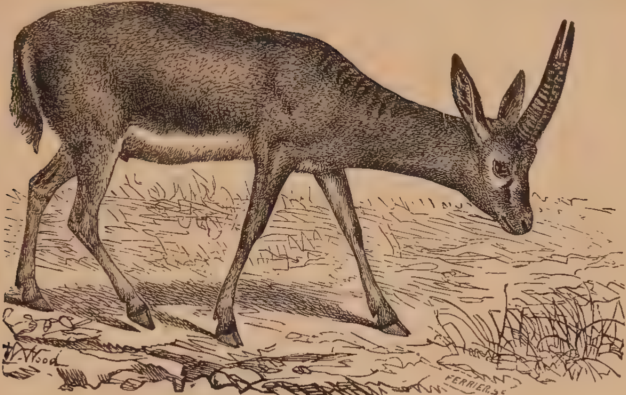
Flying-fish, (*Exocœtus*,) a genus of fishes that, on account of the extraordinary length and size of their pectoral fins, are enabled to spring from the water and support a kind of temporary flight through the air. Their distinguishing features are—pectoral fins nearly equal to the body in length; head flattened above and on the sides; the lower part of the body furnished with a longitudinal series of carinated scales on each side; dorsal fin placed above the anal; eyes large; jaws furnished with small pointed teeth. Although some few naturalists have supposed that these fish possess the true power of flying, that is, by beating the air with their members, it is generally agreed that their large fins sustain them, parachute-wise, when they have leapt from the water. "I have never been able to see any percussion of the pectoral fins during flight, and the greatest length of time that I have seen this fish on the fin has been thirty seconds, by the watch; and the longest flight mentioned by Captain Hall is two hundred yards; but he thinks that subsequent observation has extended the space. The most usual height of flight, as seen above the surface of the water, is from two to three feet; but I have known them come on board a ship at a height of fourteen feet; and they have been well ascertained to have come into the channels of a man-of-war, which is considered as high as twenty feet and upwards. But it must not be supposed they have the power of elevating themselves after leaving their native element; for, on watching them, I have often seen them fall much below the elevation at which they first rose from the water, but never in any one instance could I observe them rise from the height at which they at first sprang; for I regard the elevation they take to depend on the power of the first spring or leap they make on leaving their native element."—(Bennett, *Wanderings in New South Wales.*) Several instances are on record of the appearance of flying-fishes off the British coast, but the species is doubtful. It is probable that both the oceanic flying-fish (*Exocœtus volitans*) and the Mediterranean flying-fish (*Exocœtus exiliens*) may have made their appearance in our seas. In the Gulf of Mexico are found some species with curious appendages or filaments attached to the lower jaw.

Flying Fox, (*Pteropus rubricollis.*)—This animal belongs to the Bat tribe, of which it is the largest species. It derives its common name of flying fox from a fancied resemblance of its head to that of a fox. It is found in the islands of the Eastern Archipelago, where it occurs in great numbers. These animals are vegetarians in their diet, and commit great ravages in the gardens and plantations in the countries in which they abound. That they may occasionally live on animal food is inferred from the fact that, when in confinement, they have been known to devour the flesh of birds with great avidity. Like the rest of the bats they are nocturnal in their habits, and, during the day, they remain suspended from the trunks of trees, usually affecting those of the fig genus for this purpose. So quietly do they keep in this clinging attitude, that any one not acquainted with the habits of the flying fox might readily mistake them for part of the tree itself, and only be undeceived when, disturbed by his presence, the seemingly long, pendent fruit suddenly assumed animal life and fluttered in masses round and round their roost.

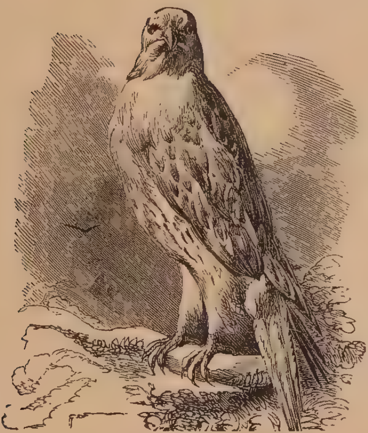
Flying Lemur, or Colugo, (*Galeopithecus volans.*)—This is another curious species, which possesses the power of flying or leaping considerable distances, by means of a membrane connecting its limbs with each other. The flying lemur forms the connecting link between the Quadrumana and the Cheiroptera; to the latter, indeed, it has a great resemblance, insomuch as many naturalists of eminence have placed it in that order. It differs, however, from the bats in many respects, not the least important deviation of which is the absence of opposable thumbs on all the feet, which are composed of five fingers united by a membrane. Notwithstanding this, it certainly bears, in its appearance and habits, a remarkable similarity to the flying fox. In its diet it is both carnivorous and frugivorous; feeding on birds and their eggs, insects, and fruits. It is found in the Indian Archipelago, living in the forests; seeking by night for its food, and remaining in a dormant state during the day, as already related of the flying fox. The natives occasionally eat this animal; but fastidious judges pronounce its flesh as being extremely nauseous.

Flying Squirrel.—By this name are known several species of squirrels, one of the most important being the Taguan flying squirrel, (*Petromys alpinus,*) which is a native of India, where it is tolerably abundant. It has derived its name from the parachute-like appendage which it possesses. This consists of a broad fold of skin, stretching along each side of the animal, from the fore to the hind legs; and when it intends making a leap, it expands this curious membrane to the fullest extent, and is thereby enabled to jump a considerable distance, although always downwards, which, in fact, is all its so-called "flying" properties are capable of. It measures about three feet in length, of which its tail occupies more than half. Its general colour is chestnut, deepening into brown on the back and red on the sides; the abdomen, throat, and breast are covered with silvery grayish-white fur. The tail is grayish-black, becoming much darker towards its extremity. The assapan, or flying squirrel of America, (*Sciuropterus volucella,*) is another variety, agreeing with the above in its leading characteristics. There are also the polatouche of Siberia and the rasoo of India.

Foot, *foot,* (Ger. *fuss,* Lat. *pes,*) in Anat., is that part of the lower extremity below the leg with which we stand and walk. It is composed of three series or groups of bones,—the tarsal, or hindermost; the metatarsal, which occupy the middle portion; and the phalanges, which go to form the toes. The tarsal bones are seven in number. Above, they are connected with the tibia and fibula bones of the leg, and below form the heel and the hinder part of the instep. They are the *astragalus,* which articulates with the tibia and fibula; the *os calcis,* or bone of the heel; the *os naviculare,* or scaphoid bone, on the inner side of the foot, articulating with the astragalus; the *os cuboides,* on the outer side of the foot, articulating with the os calcis; the three cuneiform or wedge-shaped bones (the internal, middle, and external) in front of the scaphoid bone, near the middle of the foot. The metatarsal bones are five in number, and belong to the class of long bones. They are connected posteriorly with the tarsal, and anteriorly with the phalangeal bones. One is attached to each of the cuneiform bones, and two to the os cuboides; and they diverge slightly outwards as they proceed forward. Their anterior ends



GAZELLE (Gazelle Dorcas).



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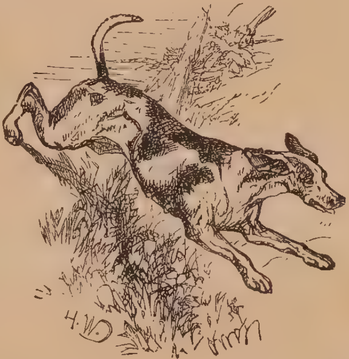

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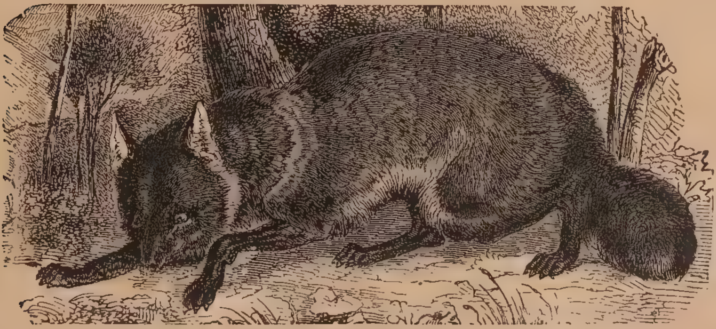


FOX, COMMON.

form the balls of the toes. The first metatarsal bone is the shortest and strongest, while the second is the longest,—the others all decreasing in length according to their distance from it. These bones form the anterior portion of the instep. The phalanges, or bones of the toes, are fourteen in number, three to each toe, except the great one, which has only two. The upper ones, which are the longest and largest, are named the metatarsal, the next the middle, and the most anterior the ungual phalanges. The bones of the foot, more particularly those that compose the tarsus and metatarsus, are firmly connected together, so that they are not liable to be displaced; and those parts where they articulate with one another being covered with a tolerably thick layer of highly elastic cartilage, they possess a considerable degree of elasticity. They are bound together in various directions by a number of ligaments, one of the principal of which is the plantar ligament, which is of great strength, and passes from the under surface of the heel-bone, near its extremity, forward to the ends of the metatarsal bones. The movements of the foot, which are permitted by the connecting ligaments, are effected by a variety of muscles. The principal movements are,—(1) that at the ankle, formed by the tibia and fibula with the astragalus, by which the foot is bent and straightened; (2) between the astragalus and os calcis, by which the foot is rolled inwards and outwards; (3) between the first and second range of tarsal bones, admitting of a very slight motion, by which the arch of the foot may be somewhat increased or diminished. Besides these there are the less complicated movements of the metatarsal and phalangeal bones. The foot, naturally a beautiful structure, is usually so much interfered with in civilised life, as to be deprived of much of its beauty, and even of its utility. Its movements are impeded by its being confined in tight-fitting boots; while, in place of the boots being conformed to the shape of the feet, the feet are made to conform to the shape of the boots. The consequence of which are corns, bunions, cold feet, and a number of other evils, from which so many suffer in the present day. Attention has lately been called to this subject by Professor Meyer, of Zurich, who has published a pamphlet, entitled "Why the Shoe Pinches: a Contribution to Applied Anatomy," which has been translated into English, and is well worth a perusal.

FORAMEN, *for'-ă-men,* (Lat. a hole,) in Anat., is a term applied to certain holes or openings of the human body, more particularly of the skeleton; as the various foramina of the skull. The *foramen ovale* is a passage or communication between the two auricles of the heart in the fœtus.

FORAMINIFERA, *fo-ră-me-nif'-e-ră,* (Lat., *foramen,* an orifice; *fero,* I bear,) the name given by D'Orsigny to a group of minute organisms having calcareous shells, which are pierced with numerous holes or foramina. Until recently, the Foraminifera were regarded as microscopic cephalopods, but they are now looked upon as protozoa. The pores are for the protrusion of delicate filaments, by the aid of which locomotion and perhaps nutrition are performed. Recent Foraminifera are beautiful microscopic objects; they are procured by dredging, or sometimes from the sand of the sea-shore. In the fossil state these tiny shells occur in rocks of all formations; they constitute the greater bulk of the chalk and the tertiary limestones. In the stone of which the buildings in Paris are constructed the shells of Foraminifera are so numerous, that this city may be said to be built of them. The shells of the *nummulites,* or coin-stones, which form mountains in the Mediterranean regions, and of which the pyramids of Egypt are principally composed, agree in essential structure with those of the Foraminifera.

FORFICULA. (*See* EARWIG.)

FORMICA, *for-mi'-kă,* (Lat.,) a genus of insects belonging to the family Formicidæ, and distinguished by having the footstalks of the abdomen composed of a single joint, the mandibles triangular, and denticulated at the edges. (*See* ANT.)

FOSSIL, *fos'-sil,* (Lat. *fossus,* dug up,) in Geol., the body, or any portion of the body, of an animal or plant buried in the earth by natural causes, or any recognisable impression or trace of such a body, or part of a body. Such is the definition given by Mr Jukes, one of the most philosophical geologists of the present day. The old geologists used to include minerals, or any other distinct bodies that were found in rocks, under the term of fossils. According to modern views, fossils are simply organic remains, allowing the word "remains" to apply even to footprints and other transient impressions. A fossil is not necessarily a petrifaction. Some fossil shells found in comparatively old rocks, such as the soft compact clays of the oolitic series, are less altered from their living state than many shells included in recent coral reefs. Wood, again, may be found in such rocks still soft and but little altered; while in much more recent formations it is entirely mineralised, and converted either into flint or into coal. That department of geology which relates to fossils is termed PALÆONTOLOGY, (*which see.*)

FOWL, *fowl,* (Sax. *fugel.*)—In its general sense, this term is nearly synonymous with *birds;* but in a more restricted sense it means those domestic birds brought up in a farmyard for the table. Fowls originally came from Persia and India, and they are valuable to the breeder in many ways, yielding profit as they do in eggs, in broods, and in feathers. The different kinds of this useful domestic creature are the Cochin-China, the Hambro', the Spangled, the Spanish, the Bantam, the Malay, the Poland, the Brahmapootra, and the Dorking. Besides these there are several other scarce specimens; as the Japanese Bantam or Silky Fowl, the Emu or Silky Cochin, the Andalusian, the Rangoon, and the Ancona fowls, all of which are bred more for exhibition than for real utility. The Cochin-China is one of the largest of the different kinds, and the colours of its plumage are buff, lemon, cinnamon, grouse, partridge, white, and black. They are capital layers, and in a short time a pair will stock a yard. The Hambro' fowl is one of the prettiest varieties, and has gold and silver plumage; they are also prodigious layers, but rarely have patience to bring up a brood. The Spanish fowl and the Dorking are the more commonly seen than the other varieties, and are certainly of more use to the breeder, being good sitters as well as layers.

The Bantams are the greatest favourites, being remarkably small birds, and having delicate plumage. It would be impossible to give a description of all the different varieties here; but the reader is referred to "A Plain and Familiar Treatise on the principal Breeds of Fowls," by Mr John Baily. The Guinea-fowl, or pintado, is sometimes classed among the common order of fowls; they are very wild and restless in their nature, and, unlike the ordinary fowls, they give no notice to any one of their laying or sitting; they have consequently to be closely watched. The Guinea-fowl is very delicate eating, and is in season about Lent. Their eggs are something like those of turkeys, but not so gross. As the Guinea-fowl rarely watches over her nest and rears a brood, its eggs are generally put under a common hen, which performs in a satisfactory manner the duties of foster-mother.

Fox, *foks*, (Ang.-Sax.)—Until very recently, the foxes were placed, by the most eminent naturalists, together with the wolf and dog; but, according to the classification of the mammalia in the British Museum, which system is now generally adopted by zoologists, it is separated from these animals, and placed in the genus Vulpes. In many particulars, it is true, the fox greatly resembles the rest of the genus Canis; but the shape of the pupil of the eye, (which is elongated,) the bullet head, the bushy tail, the long body, supported on short limbs,—all these characteristics fully establish the soundness and correctness of the position to which the fox is assigned in the collections of the great national repository of science. The common fox, (*Vulpes vulgaris*,) is the only species found in this country. Of so well-known an animal, any minute description would be superfluous. Its colour is reddish-fawn, intermixed with black and white hairs; its tail, or "brush," is of the same colour, except at the tip, which is white. It measures about two feet and a half in length, and twelve inches in height. Its coat is much heavier and thicker during the winter months, when its fur is of greater value than in warmer weather. Linnæus restricts its geographical range to Europe, Asia, and Africa; Cuvier says it is found from Sweden to Egypt inclusively. In eighteen months, the fox attains maturity; and its life varies from twelve to fourteen years. As this, however, can only be said of those animals which have been captured young, or born in confinement, it is probable that, in a wild state, the fox lives to a much greater age. The fox emits a most unpleasant scent, which proceeds from certain glands situated at the root of the tail. This powerful odour is rendered more disagreeable from the remarkable tenacity with which it clings to any object which it has once touched. The common fox lives on rabbits, hares, partridges; and when occasion offers it a chance of obtaining entrance into the farmyard, it often commits great havoc among the poultry. This food failing, it will resort to worms and insects for a means of subsistence; and, when dwelling near the sea-coast, sometimes makes a meal of the mollusca and crustacea it can manage to pick up on the shore. It burrows in the ground like the rabbit; and, indeed, often turns out that animal from its domicile to take up its own abode there. Besides the above species, there are several others:—The Persian fox, (*V. flavescens*,) the Arctic fox, (*V. lagopus*,) the American fox, (*V. calvus*,) the South-African fox, or Caama, (*V. Caama*,) the Senegal fox, (*V. dorsalis*,) the Kit fox, (*V. cinereo-argentatus*,) the Kokree, (*V. bengalensis*,) the Salora, (*V. niloticus*,) and one or two others, which are doubtful members of this family.

FOXHOUND, *foks'-hownd*, (Ang.-Sax.,) a species of dog used in the sport of fox-hunting. An extraordinary amount of care and attention has been given to the proper breeding of this animal; and no pack can be justly considered perfect without each particular animal composing it being especially picked out as adhering to the rules laid down for the guidance of dog-fanciers. In the true foxhound, nearly all the individual good qualities which distinguish other varieties of dogs are combined; and, for fleetness, strength, fine scent, spirit, perseverance, and subordination, they have no equals. The foxhound is not a very large animal, his height averaging from twenty to twenty-two inches. The colour of the foxhound is generally pied; such as yellow, black, dun, fallow, and brown intermixed. In order to be perfect, an old authority on the chase observes, that the animal should be of the following proportions: his legs straight as arrows; his feet round, and of medium size; his shoulders black; his breast wide; his chest deep; his back broad; his head small; his neck thin; and his tail bushy, thick, and well-carried. A celebrated foxhound bitch, belonging to Colonel Thornton, named Merlin, has been known to run four miles in seven minutes and half a second—a pace which nearly equals that of the fastest race-horse.

FRANCOLIN, *frank'-ō-lin*, a genus of partridges inhabiting the Himalayas, remarkable for its great size, and the numerous spurs on the legs. The Sanguine Francolin, (*Ithaginis cruenta*,) is about as large as an ordinary fowl, and derives its name from the blood-red streaks which are drawn over the breast and upper part of the abdomen.

FRATERCULA. (*See* PUFFIN.)

FRIAR-BIRD, (*Tropidorhynchus corniculatus*,) a remarkable bird of Australia, having the head bare, black, and leathery, and a knob at the base of the beak. It is one of the honey-eaters, and is very active. It is also very combative, and fights every bird that comes near its nest, caring nothing for size, and assaulting a pelican as readily as a finch. On account of its bare head it is sometimes called Monk-bird, and Leatherhead, and its peculiar cries have earned for it the names of Pimlico, Poor Soldier, and Four-o'clock.

FRIGATE-BIRD, (*Fregata Aquila*, Ray,) a bird common on the intertropical American coasts, and in the Atlantic and Pacific oceans. It is allied to the cormorants, but differs from them by having a forked tail, short feet, the membranes of which are very deeply notched, an extraordinary spread of wing, and a beak, both mandibles of which are curved at the tip. The plumage is, on the upper parts purple-black, the throat and belly white, and the beak red. The frigate-bird is incapable of either swimming or diving; yet it manages to satisfy its natural appetite for fish with tolerable certainty: this is accomplished by a system of highway robbery, perpetrated on such gannets and sea-swallows as may be returning with full pouches to their nests in the rocks. The common mode is for the frigate-bird to soar above its victim, and then, plunging down, to strike it on the head with its beak; the result is an instant disgorging of the day's fishing, which, as it falls, is followed by the robber, who invariably overtakes and secures it before it reaches the water. The nest of this bird is usually built among the rocks, on solitary islands, or in high trees in retired situations near the sea. It lays two pinky-white eggs.

FRINGILLIDÆ, *frin-jil'-le-de*, (Lat. *fringilla*, a chaffinch,) a term applied to a class of birds belonging to the order Insessores, and its division Conirostres. They are characterised by a broad-based, sharp-pointed, conical beak, the size of which, in comparison with their head, is something enormous. It is well known that the Fringillidæ feed almost entirely upon different seeds of plants and nuts; consequently their beak is required to be strong in order to enable them to obtain their food; and, in some parts, where the nuts, &c., are covered with extremely hard shells, the beaks of these birds are found to be stronger and larger. The class includes all buntings, crossbills, grosbeaks, linnets, canary-birds, finches, and many other conirostral birds. The Fringillidæ are more vulgarly known under the general term of Finches, (*which see.*)

FROG, *frog*, (Sax. *froga*,) (*Rana.*)—The frogs are chiefly distinguished from the toads by the unusual length of the hind feet, which are strong and well-palmated; hence their great power both of jumping and of swimming; their skin also is smooth; and there is not only a row of fine teeth round the upper jaw, but the palate also is furnished with another row placed transversely. The frog deposits its ova or spawn sometime in March, in a clustered gelatinous mass. This lives for a month or five weeks, and at the end of that time there issues from each little black globule a living tadpole. In this their first stage, the young frogs have an elongated body, a laterally-compressed tail, and external branchiæ; their small mouth is furnished with small hooks or teeth, and they have a small tube on the lower lip, by which they attach themselves to aquatic plants, &c. The external branchiæ next disappear, and become covered with a membrane, being placed in a sort of sac under the throat; and the animal then breathes after the manner of the fishes. Furnished with eyes and nostrils, the body of the animal is distended with the great extent of the digestive canal, and it has a large tail for swimming. Soon, however, the posterior limbs are gradually put forth near the origin of the tail, and are developed first; the anterior feet then begin to show themselves; the tail gradually becomes less and less, shortens, shrinks, and seems at last to be absorbed; the mouth widens, and loses its horny processes or jaws; the eyes are guarded by eyelids; the belly lengthens and diminishes in comparative size; the intestines become short; the true lungs are developed, and the internal branchiæ are obliterated; the circulation undergoes an entire change; and the animal, hitherto entirely aquatic and herbivorous, becomes carnivorous, and for the most part terrestrial. In the frog the muscular system, especially the muscles of the abdomen, are more developed than in the other reptiles; offering in this particular some analogy to the abdominal structure of the mammifers. But it is in the disposition of the muscles of the thigh and leg in the frogs and other anurous batrachians, that the greatest singularity is manifested. These, whether taken conjointly or singly, present the greatest analogy with the muscular arrangement in the same parts in man. We find the rounded, elongated, conical thigh, the knee extending itself in the same direction with the thigh-bone, and a well-fashioned calf to the leg, formed by the belly of the gastrocnemii muscles. It is impossible to watch the horizontal motions of a frog in the water, as it is impelled by these muscles and its webbed feet, without being struck by the complete resemblance in this portion of its frame to human conformation, and the almost perfect identity of the movements of its lower extremities with those of a man making the same efforts in the same situation. By the aid of these well-developed lower limbs, and the prodigious power of their muscular and bony levers, a frog can raise itself in the air to twenty times its own height, and traverse in a single bound a space nearly fifty times the length of its own body. There are several species of frogs, and among the most peculiar may be mentioned the bull-frog of North America, (*Rana pipiens*,) and the tree-frog, (*Hyla leucomystax*, Graves.) The former is a very large species, measuring eight inches in length and four in width. Its colour is olive on the upper part, and greenish-white, darkly spotted, on the belly. It is said that this frog affects springs only, and, although it is a great destroyer of young goslings, it is tolerated from the benefits derived from its scavenger habits. Its chief peculiarity is its voice, which resembles the distant bellowing of a bull. Of the tree-frog there are several species. They are found in France, Germany, and Italy, as well as in America and Asia. Says Sir Emerson Tennant: "In the shrubberies around my house at Colombo, these graceful little frogs were to be found in great numbers, crouching under broad leaves, to protect them from the scorching sun. Some of them utter a sharp metallic sound at night, like that produced by smacking the lips. They possess in a high degree the power of changing their colour; and one which had seated himself on the gilt pillar of a dinner-lamp was scarcely to be distinguished from the ormolu to which it clung. They are enabled to ascend glass by means of the suckers at the extremity of their toes. Their food consists of flies and minute coleoptera." Although this latter species live in trees, they lay their eggs in the water, and even hybernate in the mud during the winter. Africa also produces a singular race of frogs, which, from having some of their toes enveloped by a conical horny claw or cap, have been termed Dactylethræ, or thimble-toed.—*Ref.* Broderip, Swainson, Tennant, Yarrell, *English Cyclopædia.*

FROG-FISH. (*See* ANGLER-FISH.)

FROG-HOPPER, a name popularly given to the hemopterous insects belonging to the family Cercopidæ. One of them is well known in its larval state as the Cuckoo-spit, on account of the frothy liquid with which its body is enveloped.

FRONTAL, *front'-ăl*, (Lat. *frons*, the forehead,) in Anat., denotes of or belonging to the forehead; as the frontal bone, arteries, nerves, &c. The frontal bone is that bone of the skull which goes to form the forehead, as well as part of the temples, the upper portion of the nose and orbits, and part of the base of the skull. It is convex anteriorly, and concave posteriorly, resembling somewhat in shape the half of a cockle-shell. On the inner surface there is a ridge, hardly perceptible at the upper part, but becoming more prominent towards the bottom, to which the falx cerebri is attached. The frontal sinus is a cavity, usually occurring between the two plates of the frontal bone behind the eyebrow, and extending to the nose.

FRUIT-CROW, *frute'-kro*, (*Gymnoderus*,) a genus of Corvidæ inhabiting Central America, and known by their straight, flattish beak, with a notch at the end of the upper mandible. There are several species of fruit-crows, differing greatly in size. As their name imports, they feed chiefly on fruit, though they also eat insects and snails.

FULGORA, *ful-go'-ră*, (Lat. *fulgor*, an effulgence,) a genus of hemipterous insects, popularly known as Lantern-flies, from their power of diffusing light in the dark. The American lantern-fly may be taken as the type of this family. The form of this insect is very remarkable. The head is dilated in front, with porrected protuberances; and it is from the hollow or lantern of the head that the light is said to proceed, and from no other part. "Two or three of these insects put into a glass vessel afford light sufficient to read by, without difficulty, if they be placed close to the bed. Even when the insects are dead, their bodies will afford considerable light, though less vivid than before; and if bruised and rubbed over the hands and face, they become luminous in the dark, like a beard smeared with English phosphorus."—Bancroft, *Nat. Hist. Guinea.* Madame Merrian, in her work on the insects of Surinam, was the first to draw attention to this insect. "The Indians," says she, "once brought me, before I knew that they shone by night, a number of the lantern-flies, which I shut up in a large wooden box. In the night they made such a noise, that I awoke in a fright, and ordered a light to be brought. We soon found that the noise came from the box, and opened it, but were much alarmed, and instantly let it fall to the ground with affright, on perceiving flames of fire issue from it; for as many animals came out, so many flames appeared. When we found this to be the cause, we recovered from our terror, and again collected the insects, much admiring their splendid appearance."

FULICA, the generic name of the Coot.

FUR, *fur*, (Fr. *fourrure*,) the long, fine, silky hair of some wild animals, as the bear, wolf, marten, beaver, which is dressed, and prepared as an article of dress. Fur being one of the principal non-conductors of heat, it is an especially warm covering, and those furs are the best which belong to animals which inhabit cold climates. The furs which are imported may be classed in two different sections,—the *felted fur* and *dressed fur*. The first section comprises the furs of the hare, rabbit, beaver, and nutria, or coypu rat, *q. v.*; and these are principally used for hat-making. Dressed furs are those which are preserved along with the felt to which they are attached, and are used for the trimming of articles of dress, mufflers, rugs, mantles, and such like. Furs are imported into this country from North America and Russia, and the trade is a very important one, as above 5,000,000 skins of fur-bearing animals are annually brought into Britain. The Russian sable is one of the most expensive, some single skins fetching £9, although the average price is between £2 and £3. The Hudson's Bay Company was established in the year 1670, by an especial charter from Charles II., for the purpose of carrying on this trade in North America, by means of hunters sent out for the purpose, and by traffic with the numerous wild tribes of Indians, which at that time populated nearly the greater part of America. Quebec and Montreal are the principal trading stations of the Company.

FURNARIUS, generic name of the Oven-Bird.

FUSUS, *few'-sus*, a genus of mollusks belonging to the family Muricidæ, and popularly called Spindle-shells, on account of their shape, which is long, slender, and spindle-like, being wide in the middle, and narrow at each end.

G.

GAD-FLY. (*See* BOT-FLY.)

GADIDÆ, *gai'-de-de*, (Lat. *gadus*, a cod-fish,) a family of fishes of the soft-finned order; as the cod. They are easily known by the position of the ventral fins under the throat, and the pointed character of those fins. The body is long, rather compressed, and covered with small soft scales. The head is scaleless; eyes lateral; jaws and anterior part of the vomer furnished with several ranges of unequal teeth; the gills large, seven-rayed, and opening laterally; a small beard at the tip of the lower jaw. Most of the species have the dorsal fin contained in two or three bundles; they have also fins behind the vent, and a distinct caudal fin. The greater number of the species live in cold or temperate seas, and furnish the greater portion of the fish obtained in England and America. Their productive powers are very great, and the numbers in which they exist in some parts of the ocean is perfectly incalculable.

GADWALL, one of the rare British ducks which occasionally visits us from North America. It is very noisy, and its scientific name is *Chaulelasmus strepera*.

GALAGO, *gal'-ă-go*, a genus of lemurs inhabiting Madagascar. They have large and naked ears, and very large eyes. They are very small, and are sometimes called Madagascar Rats.

GALATHEA, *gal-a-thee'-a*, a genus of long-tailed crustacea, popularly called Plated Lobsters. They are beautifully coloured, but live on and in the mud. The claws are rather large, and the body flattish.

GALEODES. (*See* SOLPUGA.)

GALEMYS. (*See* DAESMAN.)

GALEOPITHECUS. (*See* FLYING LEMUR.)

GALERA. (*See* TAYRA.)

GALL-BLADDER, *gawl*, (Sax. *gealla*, gall; Lat. *vesicula fellis*,) in Anat., is an oblong membranous receptacle, situated on the concave side of the liver, under the right lobe. It is about the size of a small hen's egg, and resembles a pear in shape. It has three coats, —an external or peritoneal, a middle or fibrous, and an internal or villous. The inner coat has a reticulated honeycomb appearance, but does not possess any follicles for the purpose of secretion. It serves as a reservoir for the bile, which, when digestion is not going on, regurgitates through the cystic duct, and is retained for future use. The cystic duct connects the gall-bladder with the hepatic duct, which proceeds from the liver, and the two, when united, form the *ductus communis choledochus*, by which the bile is conveyed to the duodenum. The cystic duct presents internally a number of folds, which are generally circular.

GALLINACEOUS BIRDS, *găl-lin-ai'-she-us*, (Lat. *gallus*, a cock,) the name applied to such birds as, in common with the domestic cock, have the upper mandible vaulted, the nostrils pierced in a large membranous space at the base of the beak, and covered by a cartilaginous scale; wings short, flight laborious, and carriage heavy. Birds of this order have an extremely powerful gizzard, and generally a large globular crop; nest artless, and placed on the ground; eggs numerous; food pointed out to their young by the parent.

GALLINULA. (*See* MOOR-HEN.)

GAMMARUS. (*See* SHRIMP, FRESH-WATER.)

GANGLION, *găng'-le-on*, (Gr.,) in Anat., is a small rounded or elongated nervous mass, of a reddish-gray colour, situated in the course of the nerves. They are of two kinds—one forming part of the cranial system of nerves, and situated near the origins of many of the cranial and all of the vertebral nerves; the other forming part of the sympathetic system, extending in a series along each side of the vertebral column, and occurring numerously in other parts. They differ widely from each other in figure and size, some of them being large and conspicuous, while others may be almost termed microscopic. They are composed of two substances, one white, like the medullary matter of the brain, the other reddish-gray, somewhat resembling the cerebral cortical substance. The internal medullary filaments are the continuation of the nerve upon which the ganglion is situated; they are invested externally by a thin but firm and closely-adherent envelope, continuous with the sheath of the nerves, and composed of dense areolar tissue. This outward covering sends processes inwards through the interior mass, dividing it, as it were, into lobules, and supporting the numerous fine vessels which pervade it. A section through a ganglion in the direction of the nervous chords connected with it discloses to the naked eye merely a collection of reddish-gray matter, traversed by the white fibres of the nerves.

GANNET, or SOLAN GOOSE, *găn'-net*, (Sax. *ganot.*)—In the north of Scotland, the Hebrides, and in Norway, this bird is very abundant. It is almost the size of the tame goose. The bill is about six inches long, jagged at the sides, and straight nearly to the point, where it inclines downwards. A loose skin, bare, and capable of considerable distension, hung from the blade of the lower bill, and extended over the throat, serves as a pouch in which to convey food to its young. The neck of the gannet is long; body flat, and very full of feathers. The crown of the head and a small space on the hind part of the neck are buff-colour, and, with the exception of the quill and the bastard wing-feathers, the remainder of the plumage is white. The legs and toes are black, but the forepart of each is marked with a bright green stripe. The male and female are nearly alike. The young are at first covered with very beautiful snow-white down; at the age of about six weeks, the feathers make their appearance, and at the end of three months they are ready to fly. The food of the gannet consists of salt water fish, the herring and pilchard being the staple. It takes its prey by darting down on it from a considerable height. It makes its nests, which are composed chiefly of turf and sea-weeds, in the caverns and fissures of rocks or on their ledges, as well as on the plain surface of the ground. The female lays three white eggs, somewhat smaller than those of the goose. It is stated, however, that the three eggs are only laid in the event of the first and second being being removed; and that if left to its own devices, the bird will lay but one egg. These birds are found in great abundance on the island of Kilda, a little spot standing remotely westward in the Atlantic Ocean. The annual "yield" of birds is computed at from twenty to fifty thousand, while the egg crop is almost incalculable. The most favourite resort for these sea-fowl, according to the late Bishop Stanley, is a tremendous precipice about thirteen hundred feet high, formed by the abrupt termination of Conadean, the most elevated hill in the island of Britain. The great dependence of the egg-takers are ropes of two sorts,—one made of strips of hide, the other of the hair of cows' tails, all of the same thickness. These ropes vary in length from fifty to two hundred feet, and are three inches in circumference. So valuable are these ropes, that a St Kilda swain marrying a damsel whose dower is a good long cowtail-hair rope, considers that he has made rather a splendid match. The scientific name of this bird is *Sula Bassanea.*

GARANGARY. (*See* ICHNEUMON.)

GARGANEY. (*See* TEAL, SUMMER.)

GARFISH, *gar'-fish*, (*Esox Belone*, Linn.,) a fish of the Pike family, common on the English, Irish, and Scotch coasts. It is about two feet in length, body tapering towards the tail, and of small circumference; beak-like snout; teeth minute and numerous; tail considerably forked. It possesses many names besides that here applied to it, and among the rest, "mackerel guide," because of its supposed habit of preceding the shoals of mackerel in their annual visits to shallow waters for the purpose of spawning.

GARRULUS. (*See* JAY.)

GASTEROPODA, *găs-ter-op'-o-dă*, (Gr. *gaster*, stomach; *pous*, foot,) a class of molluscous animals, whose means of locomotion consist of a fleshy disc or foot situated under the abdomen. They are both terrestrial and aquatic, and naked and possessed of a shell. Of the naked Gasteropoda, the common slug will serve as an example. Among the terrestrial of the genus is found the snail; and among the aquatic, the whelk, winkle, &c.

GASTEROSTEUS. (*See* STICKLEBACK.)

GASTRIC JUICE, *găs'-trĭk*, (from *gaster*, the stomach,) is the name given to the digestive fluid contained in the stomach, and which is secreted by the gastric glands on the introduction of food or other foreign substance. It is a clear transparent fluid, inodorous, a little saltish, and very perceptibly acid. Its most singular component is a peculiar organic substance called *pepsine*, to which its special properties are chiefly owing. The use of the gastric juice is to dissolve the various kinds of food in the stomach, reducing the albuminous and gelatinous portions of it to a state fit for absorption into the system. It has also an antiseptic property, as it suspends putrefaction and restores the freshness of tainted meat.

GASTROCHŒNA, *gas-tro-keen'-a*, a genus of bivalve molluscs, in which the shells are thin and gaping, with very long, contracted siphons. A shelly tube is sometimes attached to the valves.

GASTRONEMIUS, *găs-tro-ne'-me-us*, (Gr. *gaster*, the stomach; *kneme*, the leg,) is the name given to the belly or calf of the leg; and is also applied to two of the muscles of that part. The *gastronemius externus* arises by two distinct heads from the inner and outer condyles of the os femoris, which unite a little below the joint; and below it unites with the gastronemius internus, to form the tendo Achillis. The *gastronemius internus*, called also the *soleus*, is situate immediately under the above, and rises by two heads from the posterior part of the head of the fibula and the upper and posterior part of the tibia. The use of both these muscles is the same, namely, to raise the heel and extend the foot.

GAVIAL, *ga'-vi-al*, a large crocodile inhabiting the Ganges. It has very long jaws, in which are about one hundred and twenty teeth. (*See* CROCODILES.)

GAZELLE, *gă-zel'*, (Fr.,) (*Antilope Dorcas*, Pallas,) one of the most beautiful and graceful of the antelopes, chiefly inhabiting Arabia and Syria. It is about three feet six inches in length, and in height measures less than two feet at the shoulder. The horns of the adult male rise nearly perpendicularly above the orbits, are black, almost cylindrical, bending at first gently backwards, and finally forwards. The ears are long, narrow, and pointed; eyes large, mild, and black. The size of the gazelle about equals that of the roebuck; but the legs of the former are considerably longer, and the entire form more graceful. The face and cheeks are reddish fawn-colour, with a dark stripe down the nose; on each side of the face, passing over the eyes, from the horns down to the nose, there is a broad white stripe, and beneath this, from the anterior canthus of the eye, a narrower dark stripe parallel to it and separating it from the fawn-colour of the cheek. The remainder of the body is dark fawn above and white beneath, the latter colour being separated by a broad brown band along the flanks. The knees are furnished with brushes of dark hair, and the ears are filled internally with long white hair. It lives in large troops, and when pursued by the hunter, flees at great speed for some distance, then stands still to gaze on him, then bounds off again. When brought to bay, these animals defend themselves with courage and obstinacy, meeting in a close circle, with the females and fawns in the centre, and presenting their horns at all points to their enemies. There are several species of gazelles, which may be known by the lyre-shaped horns of the male, (the female being hornless), the tapering nose, and the tear-bag distinct.

GECKOS, a group of remarkable lizards, found in various parts of the world, and having their toes furnished with flattened sucking-pads, by means of which the creatures can run up a perpendicular wall, or even across a ceiling.

GELADA, *gel'-ad-a*, a singular baboon of Abyssinia, remarkable for the heavy mane which hangs over the shoulders, and which only grows when the animal is adult. It is called *Selada Ruppelii*, in honour of Dr Ruppell, its discoverer.

GELATINE, or GELATIN, *jel'-ă-teen, jel'-ă-tin*, an azotised principle, which has hitherto been obtained from animal tissues only. Bones, skins, flesh, and other parts of the animal, yield gelatine when boiled, but it does not appear to exist in a free state in any of these substances. Gelatine softens and swells in cold water, but does not dissolve until the liquid is heated. When the solution cools, it solidifies to a firm jelly; hence its name. It is insoluble in alcohol and ether, and may be precipitated from its aqueous solution by the former. With tannic acid it forms an insoluble compound of a buff colour, which is the basis of leather. It is also abundantly precipitated by solutions of corrosive sublimate and bichloride of platinum. By continued boiling, gelatine is converted into metagelatine, which does not possess the property of gelatinising as the liquid cools. The term is derived from the Spanish *gelatina*, from the Lat. *gelo*, I freeze.

GEMSBOK, *gems-* [not *jems*] *bok*, a splendid antelope of South Africa, (*Oryx Gazella*,) remarkable for the long and very straight horns with which it is armed. One of these horns in the writer's possession is three feet in length, black as ebony, highly polished, and sharp as a rapier. With these weapons even the lion is foiled, and instances have been known where both the lion and the gemsbok have been killed.

GENERATION. (*See* PHYSIOLOGY.)

GENERATIONS, ALTERNATION OF, *jen-e-rai'-shunz*, (Lat. *generatio*.) a term applied by Professor Steenstrup to a series of phenomena connected with the mode of reproduction of many of the lower animals. In their development from the ovum to the adult state, a large number of these beings not only pass through various stages, as exemplified in the insect tribe, but also possess the power of multiplying themselves at certain periods of their growth. The animals which exhibit this peculiarity have been called "nurses," and the phenomenon has been particularly observed in the Acephalæ, Entozoa, Polypiferæ, Salpæ, and Vorticellæ. In the translation of Professor Steenstrup's work by the Ray Society, the alternation of generations is fully described. The mode of development by means of "nurses," or intermediate generations, is shown to be an ordinary phenomenon in nature. "The circumstance," he observes, "of an animal giving birth to a progeny permanently dissimilar to its parent, but which itself produces a new generation, which either itself or in its offspring returns to the form of the parent animal, is a phenomenon not confined to a single class or series of animals; the vertebrate class is the only one in which it has not yet been observed. It would consequently appear that there is something intrinsic in this mode of development, and that it occurs, as it were, with a certain necessity; on which account it will undoubtedly soon be recognised to a greater extent and more generally." If the whole system of development by means of "nursing" generations be collected and regarded in one view, it appears, as the essential feature in this course of development, that the species is not fully represented in the solitary, full-grown, fertile individuals of both sexes, nor in their development; but that to complete their representation, supplementary individuals, as it were, of one or of several precedent generations are necessary. The greatest incompleteness and the highest degree of mutual dependence is to be observed in the Campanulariæ and similar polypes, in which the generations representing the unity of the species are very unlike each other, and in which all the individuals are fused into an outward unity, or into a set of polypes. "They exist organically connected with each other, and are normally free only in their first generation, and, indeed, only in their earliest stage of development, and only for a short time; since the free-swimming ciliated embryo swims about in the water at most for some hours, in order to find a suitable place for the foundation of a new polype stem. In the Corynæ claviform polypes, the organic connexion between the individuals and generations is rather more lax; the perfect gemmiparous or ovigerous individuals are usually quite free, often even at an early age; so that they do not attain their full development until after their separation from the 'nursing' generations. In the Medusæ and Scalpæ, the generations which are connected together into one whole become more like each other." Among the Entozoa, similar attempts at becoming free and accomplishing a perfect growth are also described. The development of animals which do not belong to the water, but to the air, also presents similar phenomena, but in a still higher and more free stage. The propagation of the Aphides through a series of generations has been long known. In the spring, a generation is produced from the ova, which grows and is metamorphosed, and, without a previous fertilisation, gives birth to a new generation, and this again to a third; and so on for ten or twelve weeks; so that in certain species which have been observed nine such changes have been noted. At last there occurs a generation consisting of males and females, the former of which, after their metamorphosis, are usually winged; fertilisation and the deposition of eggs take place, and the long series of generations recommences in the next year and in the same order.—Ref. *Transactions of the Ray Society*, —J. J. Steenstrup *on the Alternation of Generations.*

Genetta, *jen-net'-ta*, a genus of Viverridæ somewhat resembling the civet cat, though not so large. The pale genetta (*Genetta Senegalensis*) is the most common; and the amer, a native of Abyssinia, is beautifully marked with dark spots on yellow-gray.

Genus, *je'-nus*, (Lat.,) in Zool., a distinct group of species, allied by common characters and subordinate to an order, family, tribe, or sub-tribe. A genus is often an arbitrary group, since, although it is a natural assemblage, nearly every naturalist has his own views with regard to the propriety of uniting or separating particular assemblages of species. The synonymy of genera has thus become more copious as the study of natural history has progressed, and presents one of the difficulties which the student of zoology has to contend against. (*See* Species.)

Geometridæ, *gee-ŏ-met'-rid-ee*, a genus of moths, so called because the caterpillars make regular steps as they walk, bringing the top extremities of the body together, and then extending for a fresh hold. Popularly these caterpillars are called Loopers.

Geotrupidæ, *gee-ŏ-troop'-id-ee*, a large family of lamellicorn beetles, in which the elytra are rounded behind, and cover the abdomen.

Gerboa or **Jerboa**, a group of Rodent animals with very long hind legs, like those of the kangaroo. They are wonderfully active, leaping about so swiftly that the eye can scarcely follow their movements, and they can spring to wonderful distances. The common gerboa of Africa (*Dipus Œgyptius*) is the best known of these animals. All the gerboas are nocturnal in their habits.

Ger-Falcon, or **Jer-Falcon**, *jer'-fawl-kon*, (Fr. *gerfaut*,) (*Falco Gyrfalco*,) a species of falcon, considered as the boldest and most beautiful of the tribe. In size it approaches closely to that of the osprey. Its general colour is brownish-gray, of varied tints above and white beneath, with brown longitudinal spots. The tail is crossed with a number of deeper and lighter bands, and the bill and legs are usually of a pale blue or yellowish colour. Three varieties of the ger-falcon are mentioned by Buffon: the first two are similar to the species above described, and the third is entirely white. The ger-falcon is a native of Russia, Norway, Iceland, and Baffin's Bay. Of all the rapacious birds, except the eagle, it is considered the most formidable, the most active, and the most intrepid; it attacks the largest birds boldly, and when transferred from the coldest climate to the warmest, its strength is not diminished, nor is its vivacity checked in any degree.

Geronticus. (*See* Ibis, Straw-necked.)

Gestation, *jes-tai'-shun*, (Lat. *gestatio*, from *gero*, I carry,) in Physiol., is applied to the period which intervenes between the time of conception and that of delivery. This period differs greatly in different animals. In the human species it is nine calendar months, or, more strictly, forty weeks, or 280 days; but by certain circumstances the period may be prolonged or shortened by several weeks; and sometimes the birth takes place as early as the seventh month. In the cow the period of gestation is nine months, in the mare eleven, in the dromedary twelve, and in the elephant twenty-one. In the smaller animals it is much less; being in the dog about sixty-three days, in the cat fifty-six, the rat twenty-eight, in the sow four months, and in the sheep and goat about five.

Gibbons, *gib'-bons*, a group of long-armed tailless apes, inhabiting Malacca and Siam. They are wonderfully active, and can fling themselves from one branch to another at an astonishing distance. They have small heads, no cheek-pouches, and there is a large air-sac under the throat, enabling them to utter very loud cries.

Gills, *gillz*, (Swedish *gel*,) a term applied to the apparatus possessed by all fishes, by means of which their respiration is effected exclusively through the medium of water. The gills, or branchiæ, are situated on each side of the neck, and are composed of several laminæ fixed on arches. These laminæ are covered with a vast number of minute blood-vessels, and are so formed as to present a considerable surface to the water, so that a suff cient portion of oxygen may be received by the blood. As the oxygen is continually being removed, the water becomes deteriorated, and it is consequently necessary that a constant current should flow over them. This is effected, in most fishes, by their taking the water in at the mouth, and expelling it under the gill-covers in regular respirations. The blood, which is continually being sent to the gills from the heart, is distributed, by means of the arteries, to every part of the body; from whence, by means of the veins, it comes back again to the heart.

GIRAFFE, *ge-răf'*, (Arab. *xarifa*,) termed in Nat. Hist. *Camelopardalis Giraffa*, is one of the tallest of quadrupeds, as it is the largest of the Ruminant order. In points of resemblance, the giraffe approaches the deer, the antelope, and the camel; and, besides this, has many singularities about it which are especially its own. In the length, slenderness, and flexibility of its neck, it surpasses all other quadrupeds, and peculiarities of conformation adapt it eminently for the life which it leads on the sandy desert. Its head resembles that of the camel, from the absence of a naked muzzle, and in the shape and organisation of the nostrils, which are oblique and narrow apertures, defended by the hair which grows at their margins, and surrounded by cutaneous muscular fibres, by which the animal can close them at will. This is a beautiful provision of nature for the defence of the air-passages, and the irritable membranes lining the olfactory cavities, from the fine particles of sand which the storms of the desert raise up and whirl about in suffocating clouds. The eyes of the giraffe are so placed as to take in a wider range of vision than those of any other quadruped, and it is thus able to see an enemy in the rear as well as in the front, when its head is elevated during the time that it is browsing on its favourite acacia plant. The weapons by which it defends itself are its horns and its hoofs. The former it does not wield by *butting*, as is the case with other Cervidæ, but swings round with a lateral movement of the neck, and hits with them sideways: the latter are very powerful, and sometimes a giraffe has been known to prostrate a lion with a single kick. Its motion in progressing is most peculiar, travelling, as it does, in a sort of crab-like movement. It lifts both its hind and fore legs on each side of the body together, and its appearance when cantering is peculiar in the extreme. The tongue is formed to suit its habits of life, and is used to hook down the branches of trees which grow beyond the height at which its muzzle can reach. The two horns with which it is provided are peculiar to both sexes, the bony part of the same being articulated by a broad, rough, epiphysial basis to the cranium, and covered by a hairy tegument. It is mentioned in Brande's Dictionary, that "a giraffe, more than two-thirds grown, will eat daily in confinement eighteen pounds of clover-hay, and eighteen pounds of a mixed vegetable diet, consisting of carrots, mangel-wurzel, barley, split-beans, and onions, and will drink four gallons of water. They copulate in March. The female has four inguinal udders: she brings forth one young one at a birth, and the period of gestation is fifteen months. The new-born giraffe measures six feet from the fore-hoofs to the top of the head, and in a few hours after birth it is able to follow the dam."

GLAND, *glănd*, (Lat. *glans*,) in Anat., is an organ of the body, composed of blood-vessels, nerves, and absorbents, in which secretion is carried on; as the lachymal, mammary, and salivary glands. They are variously divided by anatomists, according to their structure or their contents. In form, glands are—1. Simple; consisting of small hollow follicles, covered with a peculiar membrane, and having a proper excretory duct; as the mucous glands of the nose.—2. Compound; consisting of many simple glands, the excretory ducts of all of which meet in one common duct; as in the sebaceous glands of the face, &c.—3. Conglobate or lymphatic glands; composed of a texture of lymphatic vessels, connected together by cellular membrane. — 4. Conglomerate; composed of numerous simple glands, with their ducts all entering into one common trunk; as the parotid and salivary glands. According to their contents, they are divided into mucous, sebaceous, lymphatic, salival, and lachrymal. There are also what are termed ductless glands, which resemble the others in external conformation, but differ from them in the absence of any duct or opening for the removal of the secreted fluid, and, indeed, few of them contain any secreted fluid. Glandular swellings are not unfrequent, especially in weak and scrofulous persons. They occur about the neck, or other parts of the body, are comparatively painless, and of very slow growth, with little or no tendency to suppuration. In such cases, the system should be strengthened with tonics, and stimulants applied to the part: sea-bathing is also very beneficial. Glandular swellings also occur in certain diseases; as scarlet fever, &c.

GLASS SNAKE, (*Ophisaurus ventralis*,) a limbless lizard of America, which is closely allied to our blind-worm, and is popularly, but erroneously, supposed to be venomous. It derives its name from its extreme fragility, a slight blow causing it to snap asunder.

GLOTTIS, *glot'-tis*, (Gr.,) in Anat., is the name given to the superior opening of the larynx, situated immediately behind the root of the tongue, and covered by the epiglottis. (*See* LARYNX.)

GLOW-WORM, *glo'-wurm*, (Ang.-Sax.,) (*Lampyris noctiluca*.)—This well-known insect is rather more than half an inch in length, and of a blackish colour. The thorax is margined with dusky red, the legs and the segments of the body being of the same colour. The female resembles the male, but is quite destitute of wings. It is now certainly ascertained that the male glow-worm is capable of emitting a phosphorescent light; though it is generally agreed, that the power exists in a very slight degree: it is to the female that the name of glow-worm usually applies. The light proceeds from the under part of the abdomen, and near the tip; and it appears that the insect has the power to increase or subdue the intensity of the light at will. In the male, the light proceeds from two small luminous points, as the writer has often observed. Latreille ascertained by experiment that the glow-worm will live a long time without air, and in different kinds of gases. If the luminous part of the body be removed, it will continue for a considerable time to shine; and when the light is apparently extinguished, can be again kindled by softening the matter in water. If immersed in warm water, the insect still preserves its luminosity, but if placed in cold water, the power is suspended. The female being a slow-moving inactive insect, it is supposed by some naturalists that the light emitted by the female acts as a beacon to the opposite sex. The larvæ have been kept for a considerable period, living upon snails, and killing those of the largest size. "Sometimes they would seize a snail whilst crawling, and when the animal retired within its shell, they would still keep their hold, and allow themselves to be carried into the shell with the snail; and although they became enveloped in the mucous secretion, it very seldom appeared to adhere to their bodies. Upon being touched or disturbed in any way, the larva emitted the phosphoric light, but not to so great a degree as the perfect insect.—(*English Cyclopædia*, art. Lampyridæ.)

GLUTTON, (*Gulo luscus*,) an enormous weasel inhabiting North America and Northern Europe, and sometimes known by the name of wolverene. It is extremely voracious and very cunning, and is much hated by hunters, because it discovers and devours their hidden stores of provisions, besides going round the traps and eating the baits. Many fabulous stories have been told of the Glutton. Its fur is valuable.

GNAT, *năt*, (Sax. *gnæt*, Lat. *culex*,) the common type of the genus Culicides of Latreille, which is a family of Dipterous insects of the section Nemocera. The proboscis is long and slender, projecting forwards, and terminated by two little lip-like appendages; sucker composed of six slender bristle-like members; palpi five-jointed, generally elongated; antennæ filiform, covered with hairs; eyes contiguous, no ocelli; wings inclined to the body, and having one marginal and two submarginal cells. The common gnat is less than a quarter of an inch in length, and is identical with the insect termed *cousin* in France, and *mosquito* in America. The pain and irritation which ensue from its sting are caused by the proboscis piercing the skin and a poisonous fluid being injected at the same time. The humming noise which accompanies its flight is caused by the vibration of its wings, which move very rapidly.—Ref. *English Cyclopædia*, sect. Natural History.

GNU, *nu*.—This animal is an antelope, belonging to the genus Connochetes. It has a broad, spreading muzzle; horns bent downwards and outwards, broad at the base, and tapering to a point; the tail long and bushy, like that of a horse; the frontal bone much depressed, and the intermaxillary bones elongated. The gnu, or kokoon, as it is variously termed, inhabits the plains and wilds of South Africa, where it roams about in extensive herds. In appearance it is very singular, and at a distance resembles a full-grown ass. The neck, body, and tail, as well as the pace of the gnu, are nearly identical with that of a donkey or small horse, while its horns, and the long hair which surrounds its face and muzzle, give it the most uncouth appearance imaginable. The gnus are extremely wild and difficult for the hunter to approach, and from their firmness and courage a good deal of danger is attendant in shooting them. In height they are generally about three feet and a half at the shoulder, and their colour is a dark brown. The horns are common to the female as well as the male. When they are surprised by the hunter, in the first alarm they commence flinging up their heals, and start about like a frightened horse; but they immediately afterwards take to flight, and career over the plains at a speed which soon out-distances the hunter, who must trust more to take them by stratagem than by hoping to run them down. When they are wounded, they will often turn on their assailant, and attack him with the greatest fury, often besieging him in some mound or tree for days. Before attacking, they first drop on their knees, and then spring upon their foe with immense impetus. It is said that the gnu is subject to a sort of eruption on the skin or other cutaneous disorder, which attacks the different herds at a particular season of the year; and that if domestic cattle become infected with it, it is certain to end in their death. When taken young, the gnu is very easily domesticated, and is often adapted to the plough in South Africa. There are at least two species of gnu, both of which may be seen in the Zoological Gardens.

GOAT, *gote*, (Sax. *gæt*.)—The domestic goat, according to Cuvier, varies more in size, stature, length and fineness of the hair, than any other animal, with the solitary exception of the dog. Its distinguishing characteristics, from the Linnæan system of zoology, are as follows:—The horns are hollow, turned upwards, annulated on their surfaces, and knotted in front. There are eight cutting teeth in the lower jaw, and none in the upper; and the male is generally supplied with a beard or tuft of hair under the lower jaw. The original stock from which this animal sprung has been discovered by the researches of modern students of natural history to have been the Ægagrus, or wild goat, which inhabits the mountains of Caucasus and Persia. The domestic goat is one of the most useful of animals to man, and it bears every temperature, from that of the tropics to as far north as Wardhuys, in Norway, where it remains exposed to all the inclemencies of the weather all day, being only sheltered at night in hovels which are nearly as much exposed as the open fields. In Norway, it feeds on moss and the bark of the fir-tree. The milk of the goat is far richer than that of a cow, and the hair is particularly useful in manufacture. The skin, especially that of the kid, is used for the making of gloves, and the flesh is often eaten, although it is rather coarse,—that of the kid is esteemed quite a delicacy. The condition of the goat in the British islands is much more wild than that of any other of our domestic animals: from its being a courageous and powerful animal, its temper and motions are particularly inconstant, and it roams over the mountains of Wales as if it had never been domesticated, although, at the sight of the herdsman, it will be far more quick and playful, and show more affection than the sheep, to which it is undoubtedly superior in many instances. The *Cashmere goat* is smaller than the domestic goat, and is likewise valued for the fineness of its fleece. This variety is a branch of the Thibet goats, which pasture on the Himalaya Mountains, in Hindostan. Both these species have a long outward hairy covering, and beneath this is a fine and beautiful coat of wool. From this wool are made the magnificent shawls which form such an important item in the Asiatic trade. Many attempts have been made to cross the breed of the goat with the sheep, and some very successful results have followed. The Cashmere goat having been bred in with the Merino, a mule has been the result, which partakes of the good qualities of both. The Rocky Mountain goat of North America is another variety, and ranks next to the Cashmere goat for the excellence of its fleece. (*See* also Angora Goat.)

Goat-moth, (*Cossus ligniperda*,) belongs to the section *Lepidoptera nocturna* moths, and its family Hepialidæ. It is nearly the largest of European moths, the expansion of its fore wings sometimes exceeding three inches. The colour of the hind wings is brown, with darker variations or mottles throughout the surface; while the fore wings are a dusky white clouded with brown, and varied with black irregular streaks, forming a species of network. The thorax is a buff-colour, and the body is of a dark brownish-gray colour, with silver rings round it. The larva is about three inches in length when full grown, and takes three years to arrive at maturity, during which time it incloses itself in a tough cocoon, formed of pieces of wood gummed together with a glutinous secretion. The larva or caterpillar lives on the wood of the poplar, oak, and aspen, which it perforates in large holes; whence its name of Ligniperda. It gives out a powerful and rank odour, whence is derived its popular name.

Goat-sucker, or Night-jar, (*Caprimulgus europæus*,) is a bird which derived its name from an absurd idea or supposition, that it was in the habit of sucking the teats of goats and other animals at night. These birds form the tribe of *Fissirostres nocturnæ* of some naturalists, and are closely allied to the swallows and swifts, from which, however, they may be readily distinguished by the largeness of their eye and the softness of their plumage,—characteristics which are common to the generality of night-birds. The bill is short and depressed, and is very broad, with an enormously wide gape, which extends beneath the eyes, and is bounded by long bristles; the tarsi are short, and the toes long and strong; the wings are long and pointed. The goat-suckers are found in all parts of the world, and their habits are nearly identical. They fly about at dusk, in pursuit of moths and beetles; and from the rapidity and elegance of their flight, they are frequently mistaken for swallows. Their colour is plain, but beautifully variegated by being freckled and barred with black, brown, and gray feathers diversely arranged. There are numerous varieties of this bird; as the banded goat-sucker and the crested goat-sucker; but they are all very closely alike. (*See* Whip-poor-Will.)

Goby, *go'-bi*, a small group of marine fishes, in which the ventral fins are formed into a kind of sucker, by which the fish attaches itself to stones and rocks.

Godwit, (*Limosa*,) a bird allied to the curlew, and common on salt marshes and fens. It is rather wary, and very noisy, uttering a loud grating cry, especially when alarmed. It is not a large bird, being from sixteen to seventeen inches in length.

Goldfinch, *gold'-fintsh*, (Sax. *gold-finc*,) (*Carduelis elegans*,) a species of bird included in the general class of Fringillidæ, and the gayest in appearance of all our native British birds. Its length from the tail to the tip of the bill is about five and a half inches, and the greatest expansion of the wings is nine inches. The bill is white, tipped with black; the forehead and throat scarlet, the head black, the back brown, and rump a pale brown, the belly white, and a beautiful yellow stripe runs across the wings, which are principally black, with white edges. Altogether, it is the handsomest bird we have, and as its song is very sweet, the goldfinch is a universal favourite. It feeds on the seeds of various plants, particularly that of the thistle. It is found throughout Europe, but principally in the United Kingdom of England and Ireland. Buffoon says of it, "that beauty of plumage, melody of song, and sagacity of disposition, are all united in the goldfinch," and if it were not a native bird, it would be much higher prized than it is. Being of very lively habits, the goldfinch can be easily trained both to imitate other birds, and thus be of use as decoy, and to perform all manner of funny tricks for the diversion of its master. "There is a company of goldfinches, linnets, and canaries now exhibiting in London, which perform a number of parts and different characters. One appears to be dead, and allows itself to be held up by the tail or leg, without showing any signs of life; another stands on its head, with its claws in the air; a third carries a couple of milk-pails, as if it had been bred up to the occupation; whilst a fourth bears a rifle, and fulfils all the duties of a sentry on guard. Another discharges a little cannon, which it attends to in the capacity of an artilleryman; while yet another draws a little carriage along with the greatest facility, in which two of its comrades are seated with the utmost *sang froid*." Many anecdotes could be related, if space permitted, of the numerous tricks which these clever little birds are able to perform. The reader is referred to Yarrell's "British Birds." (*See* also Fringillidæ.)

Gold-fish, (*Cyprinus auratus*,) belongs to the general class Cyprinidæ, and the section *Malacopterygii abdominales*, a species of fish distinguished by having the mouth small, formed by the intermaxillary bones, and devoid of teeth, the branchiostegous rays few, and the scales generally of large size. The gold and silver fish, as the gold carp is termed, has been long known in England; it was introduced into this country in the year 1691, from China, of which land it is a native. It is called the gold-fish from the splendid brilliant colour of the membrane which lies immediately beneath the scales. It is completely naturalised in Europe; in Portugal, in fact, it breeds freely in the open rivers. The colours of this fish are very various, some being all gold-colour, whilst others are of a fine bluish-brown or silver hue. When young it is very dark, nearly of a black colour. Sometimes the fins are doubled in the gold-fish, and they often have triple tails. It is not eaten, but valued from the beauty of its appearance.

Goliath Beetle, *go-li'-ath bee'-tl*, (*Goliathus Drurii*,) comes under the general family of Cetoniidæ, a class of coleopterous insects which belong to the Lamellicornes, or Pentamera. This family contains several sub-genera; but that which is generally known as the goliath beetle is the *Goliathus cacicus*, which is a native of Africa and South America. This insect is remarkable for its large size; and, on account of its beauty and the difficulty of obtaining specimens, it is much prized amongst collectors. The goliaths are said to be roasted and eaten by the natives of the countries they inhabit, who deem them a great dainty. It is said, also, that sometimes £40 or £50 has been known to be given by entomologists for specimens of this insect, and that even now they fetch generally £5 or £6! The *Goliathus polyphemus* is another variety of this species, as is also the *Goliathus micans*, the latter of which changes its colour as it is held in different positions to the light. From the reason already given, of its rarity, not much is known as to the habits of either species of this insect.

GOOSANDER, *Mergus castor*, a bird allied to the common cormorant, and resembling it in habits and form, though its colour is different, being deep green on the head and neck, black on the back, and ruddy-buff on the chest and abdomen. The bill is scarlet, and the legs orange.

GOOSE, *goose*, (Sax. *gos*, Lat. *anser*,) belongs to the order Natatores, Anseres, or Palmipedes, of the general family of Anatidæ. The following are its characteristics:—Beak about the same length as head; conical, and elevated at the base, which latter is covered by a cere or skin; the lower mandible is inferior in size to the upper; nostrils lateral in form and placed towards the middle of the beak, which is pierced anteriorly; the legs placed under the centre of the body; the tarsi long, the hind toe free, articulated upon the tarsus. The general recognised type of the whole class is the *Anser niveus*, or snow-goose of Pennant and Wilson. This bird feeds principally on rushes and insects, and in the autumn on berries. It is found generally in the barren regions of North America, where it breeds in the most prolific manner. The *grey-lag*, or common wild goose, is the origin of the domestic goose; and, according to Pennant, is our largest species of this family. The heaviest weigh about 10 lbs., their length being 2 feet 9 inches, and their extent 5 feet. The bill is large, and of a flesh-colour, tinged with yellow; the back gray; the breast and belly whitish, tinged with gray or ash-colour; and the wings and tail generally pure white, or at most merely tinged with the grey tint which prevails, more or less, over the whole body. It principally inhabits the sea-shores and marshes of oriental countries, and it rarely advances northward above the latitude of 53°. The tame goose is one of the most useful of birds to man, whether it is considered with respect to its flesh or its feathers. The naturalist Pennant writes that they are kept in "vast multitudes in the fens of Lincolnshire; a single person has frequently 1000 old geese, each of which will rear seven; so that towards the end of the season he will become master of 8000. I beg leave to repeat here a part of the history of their economy from my "Tour in Scotland," in order to complete my account. During the breeding season these birds are lodged in the same houses with the inhabitants, and even in their bed-chambers: in every apartment there are three rows of coarse wicker pens, placed one above another; each bird has its separate lodge divided from the other, which it keeps possession of during the time of sitting. A person called a gozzard, that is gooseherd, attends the flock, and twice a day drives the whole to water, then brings them back to their habitations, helping those that live in the upper stories, without ever misplacing a single bird. The geese are plucked five times in the year; the first plucking is at Lady-day, for feathers and quills; and the same is renewed four times more between that and Michaelmas for feathers only. The old geese submit quietly to the operation, but the young ones are very noisy and unruly. I once saw this performed, and observed that goslins of six weeks old were not spared; for their tails were plucked, as I was told, to habituate them early to what they are to come to. If the season prove cold, numbers of the geese die by this barbarous custom. When the flocks are numerous, about ten pluckers are employed, each with a coarse apron up to his chin. Vast numbers of geese are driven annually to London to supply the markets; among them all the superannuated geese and ganders, (called the 'cagmags,') which by a long course of plucking prove uncommonly tough and dry. The feathers are a considerable article of commerce; those from Somersetshire are esteemed the best, and those from Ireland the worst." The Bean-goose (*Anser segetum*) is a regular winter visitant to England, which country it generally arrives in in October, seldom leaving before April or May. The Canadian goose (*Anser canadensis*) is one of the great sources of food in the fur-countries of North America. When it arrives from more southern latitudes, it is shot and otherwise killed in large numbers, with sticks and stones, and is carefully preserved in ice with the feathers on for the winter, during which rigorous season it is one of the principal articles of diet to the inhabitants of the fur-countries. The plumage of this bird is generally gray, and in its contour it approaches more closely to the swan (*Cygnus*) than any of the other branches of the family Anatidæ. The Brent goose, or *Anser torquatus*, is another variety of this tribe, and it is one of the smallest, as well as the most numerous in the British islands. It is a regular winter visitor to the shores of our maritime counties, says Yarrell, and it remains with us through all the cold months of the year, its predilection being more for the south and east coast. In the adult male, the bill is black, and only an inch and a half in length; the irides very dark brown, almost black; the forehead low, the head small and black; the neck all round black, except a small patch on each side, which is white, but marked with a few regularly-placed black feathers; back, scapulars, wing-coverts, and tertials, dark brownish-black, the edges a little lighter in colour; primary and secondary quill-feathers black; the rump black; upper tail-coverts white; tail-feathers black; upper part of the breast black; lower portion of the breast and the belly slate-gray, with lighter coloured margins; vent and under tail-coverts white; legs, toes, membranes, and claws black. This description is taken from Yarrell's "History of British Birds," in which it is likewise added that the general length of the *Brent goose* is twenty-one inches, and the expanse from the carpal joint to the end of the wing thirteen inches. It may be mentioned that the livers of geese are esteemed as great a dainty in the present day as they were amongst the ancient Romans; a dish termed *pâte de fois gras* being made of them, which is a great favourite with epicures, and consequently high in price.—Ref. *English Cyclopædia*, sec. Natural History; Yarrell's *History of British Birds*. (*See* also Gannet.)

Gopher, *go'-fer*, (*Testudo Gopher*,) a moderate-sized land tortoise of America, inhabiting the southern states. It is partly social, being generally found in numbers, and choosing dry and sandy places, which it fills with burrows. The eggs are valued for the table.

Gorgonia. (*See* Fan, Sea.)

Gorilla, *go-ril'-lă*, (*Troglodytes Gorilla*,) a species of large ape which inhabits Western Africa. It is generally referred by naturalists to the same genus with the chimpanzee, but M. Geoffroy St Hilaire has endeavoured to establish a separate genus for it. For a great number of years there was a vague tradition, unsubstantiated by reliable evidence, that apes of great size were to be seen on the west coast of Africa. It was not, however, till 1847 that the gorilla absolutely became known to naturalists. A skull of one of these large apes was sent to Dr Savage, of Boston, by Dr Wilson, an American missionary on the Gaboon river; and during the same year Dr Savage, writing to Professor Owen concerning the gorilla, says, "As yet I have been unable to obtain more than part of a skeleton. It belongs to the Simiadæ, and is closely allied to the orango proper. It reaches nearly, if not quite, the height of five feet in the adult state, and is of a large size. I am considerably in doubt in regard to its identity with an animal said to have been known to Buffon as a large species of orang-outang, under the name of pongo." Since that period skeletons and skins of the gorilla have not only been received, but also considerable information concerning the animal's habits and mode of living. In M. Du Chaillu's "Explorations and Adventures in Equatorial Africa," there are some very interesting accounts of the gorilla. Considerable doubt has been cast over several of the statements in the work, but the narrative is considered trustworthy by Professor Owen and several of the highest scientific authorities. The points of difference between the gorilla and the chimpanzee are as follows:—The gorilla is much longer than the latter animal; the ordinary height of a full-grown male is between 5 feet 6 inches, and 5 feet 8 inches, and it is probable that many of the largest size exceed six feet in height. Its strength is tremendous, and its skeleton indicates great power in the jaws and limbs. The bony ridges above the eyes are very prominent, and the skull of the male exhibits a large occipital ridge on the top of the head. The brain is small, and the nasal bones project more than in the chimpanzee: these peculiarities give to the animal a hideous resemblance to the human face. The jaws and lower parts of the face project very much, and the teeth do not form an uninterrupted series, as in man. The canine teeth are very large, and the molars bear a greater proportion to the incisors: thus again approaching the features of a human being. It is very broad across the shoulders, has thirteen pairs of ribs, and approaches nearer to the human form in the shape of the pelvis than any other ape. The legs, although shorter in proportion than those of a man, are longer than those of the chimpanzee. When standing erect, the arms nearly reach the knees. The feet are formed for walking on the ground, and the great toe is a true thumb. The hands are remarkable for their great size and strength, the fingers being short but very thick. The skin of the gorilla is black in colour and covered with dark gray hair, which changes to a tawny brown on the head. The hair is longest on the arms. The face is hairy, but the chest is bare. The mouth is large and wide, and there is scarcely any appearance of neck. The eyes are much sunk, and in general the countenance is marked by a ferocious scowl. It is a voracious feeder, its food being exclusively vegetable: and its belly is very large and prominent. Gorillas are not gregarious in their habits; they generally live on the ground, but spend much of their time in climbing trees in search of food. Their immense strength enables them to defend themselves against beasts of prey. They live in the densest parts of the tropical forests, and are much dreaded by the inhabitants. As yet the gorilla has not been tamed, and it would appear as if it were incapable of being so in an adult state. Many stories are told of the gorilla being made to work by the inhabitants in some parts of Western Africa: these narratives are perfectly fabulous. In Du Chaillu's work there is a description of two species of Troglodytes discovered by himself,—one the koolo-kamba, and the other the nshiegombouvé, which is smaller than the gorilla, and remarkable for a shelter which it makes with leaves in order to protect itself from the rain. In shape this shelter is not unlike an umbrella. The gorilla is called by the inhabitants ngina or ingeena.—Ref. *Transactions of the Zoological Society*, vol. iii., and Du Chaillu's *Explorations and Adventures in Equatorial Africa*.

Goshawk, *gos'-hawk*, (Sax. *goshafoc*, goose-hawk,) (*Astur palumbarius*,) is a bird which belongs to the general family of the Falconidæ, of which it is more or less a type. Its generic characters, according to Yarrell, are as follows:—Bill short, bending from the base, with the cutting-edge of the upper mandible produced, thus forming a festoon; nostrils oval; wings short, reaching only to the tail-feathers, the fourth quill-feather being the longest; the legs stout, and the tarsi covered in front with broad scales; the toes of moderate length, the middle toe being the longest, and the laterals nearly equal in length. The great distinguishing points between the goshawk and the falcons are the lobe, or festoon, instead of the sharp tooth on the cutting-edge of the upper mandible, and the short and rounded form of the wings. Although inferior in powers to the falcon, the goshawk is the best of the short-winged hawks; but its habits and mode of flying its game are very different, as it does not *swoop*, but glides along, at a short distance from the ground, in an even line with the bird it pursues. A full-grown female measures from twenty-three to twenty-five inches in length; and the males one-third, or sometimes one-fourth less. When adult, the plumage is generally similar. The beak is horn-colour, or bluish black; the cere and irides yellow; the top of the head, the whole of the back, upper surface of the wings and tail-feathers of a dark grayish-brown colour: in the female, this tint is more of a clove-brown. The upper surface of the tail-feathers is bound with even a darker brown colour, while a band of white, variegated with spots and bars of black, passes over the cere, the eyes, cheeks and ear-coverts, the nape of the neck, throat, breast, belly, and thighs. The under tail-coverts are white, the cere, cheeks, and ear-coverts, grayish-brown, forming an elongated dark patch on the side of the head. while the legs and toes are yellow, and the claws black. The goshawk is used principally for the pursuit of hares, rabbits, and partridges, on account of its low flight. It is not very eager in hunting its prey, as, if its speed is eclipsed, it sits patiently on a tree, and waits for other game to present itself.—*Ref.* Yarrell's *British Birds.*

Gowdie. (*See* Sculpin.)

Grakles, a group of birds belonging to the genus Gracula, and including a vast number of species, such as the Mino bird of India.

Grallæ, Grallatores, *grăl'-le, grăl-lai-to'-reez*, (Lat. *grallæ*, stilts,) the wading-birds, the fourth of the six orders into which Linnæus divided the class Aves, or Birds. The order is thus described by him:—Bill subcylindrical, and rather obtuse; tongue entire, fleshy; feet wading, the thighs half-naked; body compressed; the skin very thin and sapid; the tail short. Their food consists of fishes, water-reptiles, and animalcules obtained in marshes, and their nests are generally found near the ground. The families of the order are the Gruidæ, or cranes; the Ardeidæ, or herons; the Scolopacidæ, or sandpipers and snipes; the Rallidæ, or rails; the Charadriadæ, or plovers; and the Tantalidæ, or ibises. It comprises all those birds which live both on land and sea, and to which both elements are essential. Those which are essentially aquatic have a short web to their toes; their wings are long, and, having no settled district, they fly from one shore to another as the seasons change. Several fossil remains of the families of this order of birds have been found. In the Paris basin, bones of birds referable to the genera Scolopax, Tringa, and Ibis, have been found; and in the fresh-water formation of Tilgate Forest, the remains of a wader, larger than a heron, were found by Dr Mantell. The fossil footsteps of wading-birds, observed by Professor Hitchcock in the new red sandstone valley of the Connecticut, show that formerly at least seven species of Grallatores existed, varying in size from that of a snipe to twice that of an ostrich.—Ref. *American Journal of Science and Arts*, vol. xxix.

Grampus. (*See* Whale.)

Grapsus, *grap'-sus*, a genus of crabs with very short footstalks to the eyes, and squared carapace. The beautiful Painted Crab of the Antilles is a good example of this genus. It is yellow in colour, spotted, and variegated with red.

Grasshopper, *grăss-hop'-per*, a species of insect common in the British islands and in foreign countries, which belongs to the general family of the Gryllidæ, which latter come under the class of Orthoptera, and its sub-section Saltatoria, or jumpers. The grasshoppers, like other Gryllidæ, are characterised by their legs and antennæ being very long and slender, the wings large and delicate, and the wing-covers often extending far beyond the extremity of the abdomen. In the male insects, these wing-covers are furnished at the base, near the suture, with a round tail-like plate, surrounded by strong ridge-like bands; and the chirping noise, peculiar to the family, is produced by rubbing the cases of the wing-covers sharply over each other, these ridges serving the purpose of a sort of drum. The common great green grasshopper of this country (*Phasgonura viridissima*) is one of the largest of our native insects, and measures about two inches in length, and three and a half in the expansion of its wings. The field-cricket, or *Gryllus campestris* of Linnæus, is another species of grasshopper; it is of a black colour, and a little larger than the house-cricket; it frequents dry sandy districts, where it burrows in the ground. The female of this latter insect is said to lay upwards of three hundred eggs.

Grayling, *gray'-ling*, (Ang.-Sax.,) (*Thymellus vulgaris*,) is a fresh-water fish of the family of the Salmonidæ, and very like the trout in habits and appearance. Its body is long and flat, and seldom exceeds eighteen inches in length. The head is small, pointed, and flattened at the top. The back and sides are silvery-gray in colour, (whence the name,) but when the fish is fresh caught, this colour is seen to be variegated with blue, gold, green, and black spots. The grayling is very abundant in England, Sweden, Lapland, and Norway, and it partakes of the usual characteristics of the rest of the Salmonidæ, although it is in season generally when they are out. (*See* Salmonidæ.)

Grebe, *grebe*, (Ang-Sax.,) a bird which belongs to the order Natatores, and its sub-section Columbidæ. Yarrell remarks, with regard to the class:—"Of the true divers among our British birds, the grebes and dabchicks belong to that division which more particularly frequent fresh water; and the great-crested grebe, the largest of the genus, is resident all the year in several parts of this country which afford reeds and other luxuriant aquatic vegetation, in which they find the required security. They breed and remain all the year, or by far the greater part of it, on some of the lakes of Wales, on the meres of Shropshire and Cheshire, on the broads of Norfolk, and in the fens of Lincolnshire. They are seldom seen to fly or walk, being mostly in the water. The form of the whole bird being that of an elongated cone, is admirably adapted for diving, and their habits can only be observed by those who live in the vicinity of their favourite pools." Besides the Great-crested grebe, there are the Red-necked grebe, the Sclavonia, the Tippet, the Little, the Horned, the Eared, the Dusky, and the Black-chin grebe. The generic characters of all are, however, very similar, and are as follows:—Bill of moderate length, straight, hard, slightly compressed, and pointed, forming an elongated cone; nostrils lateral, concave, oblong, open in front and perforate, closed behind by a membrane; legs and feet long, attached behind the centre of gravity; tarsi very much compressed; three toes in front, one behind; anterior toes very much flattened, united at the base, surrounded by an extended membrane; no true tail; wings short. The length of the grebe is generally between twenty-one and twenty-two inches,

and from the carpal joint to the end of the longest feathers is eight inches. The generic title is *Podiceps.—Ref.* Yarrell's *History of British Birds.* (*See* Dabchick.)

Greenbone, a name of the Garfish.

Greenfinch, *green'-fintsh,* (*Loxia chloris,*) belonging to the Coccothraustes, a species of insessoral bird, of the class Fringillidæ. It is also called the Green Linnet and Green Grosbeak. The beak is conical, and very thick at the base, gradually tapering to a point, and of a white colour generally. The head and back of the bird are yellowish green, the breast and rump yellow; the tail slightly forked, black in the centre, and yellow at the edges; the wings long, and green in colour. The greenfinch is very common in England, and it is easily tamed. It imitates the songs of other birds, but is not much prized as a native songster. (*See* Grosbeak.)

Greenland Whale. (*See* Whale.)

Gregarious Animals, *gre-gai'-re-us,* (Lat. *gregarius,* from *grex,* a herd,) is a term applied, in Nat. Hist., to those animals which have the habit of assembling or living in flocks or herds.

Greyhound, *gray'-hownd,* (Ang-Sax.,) (*Canis graius,*) a species of dog used for the chase, which appears to have been known even in the most remote ages of antiquity, as it is represented on some of the oldest of Egyptian monuments. Its first portraiture that can be relied on is in a painting on one of the tombs of the fourth dynasty of Egypt, which must be upwards of 4000 years old. The cultivated English greyhound, according to Blaine's "Encyclopædia of Rural Sports," exhibits a model of elegance, and a combination of symmetrical proportions probably unrivalled by any other animal but the race-horse; and the perfection of the mechanism for speedy progression is apparent throughout its structure. As the greyhound hunts by sight rather than by smell, its eyes are placed more conspicuously forward than in other dogs. The head is beautifully shaped, and slender in proportion; its muzzle is long and pointed; the ears droop at the points; the back is broad and muscular; the body being lank, and very much contracted in its lower parts. The legs are long and muscular, while the chest is capacious and deep, with the tail slender, and curved upwards at the end. The Irish greyhound, or *wolf-dog,* is a variety of this animal: it is stronger and larger, but it is not so fit for hunting purposes, as it lacks the speed and keen eyesight of the true greyhound. The Italian greyhound is a much smaller variety than the English, and is a very delicate animal. From its diminutive form and tender constitution, it is more fit for the duties of a lapdog than for those of the chase.—*Ref.* Blaine's *Encyclopædia of Rural Sports.*

Gribble, *grib'-bel,* (*Limnoria terebrans,*) an isopod crustacean, not unlike a very small woodlouse, which bores into the submerged timber, and is very destructive.

Grig. (*See* Eel.)

Grison, *gris'-son,* a pretty little animal belonging to the weasels, and inhabiting Paraguay. It is remarkable for being black on the under-surface of the body, and nearly white above. In captivity it is an amusing and playful creature. It is sometimes called the Huron.

Grivet, one of the Abyssinian monkeys. It is small, and is of a green-gray colour, relieved by a large patch of long, whitish hairs, that shadow each side of the head like whiskers. It belongs to the large genus Cercopithecus. Sometimes it is called the Tota.

Grosbeak, *grose'-beek,* (*Coccothraustes,*) a bird which comes under the general head of Fringillidæ, in the sections of Insessores, Conirostres. The characteristics of the class are given under Fringillidæ, to which the reader is referred. There are several varieties; as the hawfinch grosbeak, (*Coccothraustes vulgaris,*) the pine grosbeak, (*Loxia enucleator;*) and the green grosbeak, which is treated under the head of Greenfinch, (*which see.*) The hawthorn grosbeak, or hawfinch, however, will suffice to describe the appearance of the bird, as between it and the others there is little difference. The hawthorn grosbeak, or common grosbeak, inhabits England, France, some parts of Italy, Germany, Sweden, and even the south of Russia. The varieties in the colour of this bird are white, yellowish-gray, and gray; the wings and tails are often white, and the plumage generally partakes of that colour. The grosbeak inhabits the woods in summer, and in the winter generally makes its appearance in towns and villages. The nest, which the female builds, is one of the prettiest kind, being coloured and decorated with all kinds of brilliantly-tinted mosses, and lined inside with down and feathers. The eggs are of a bluish-green colour, with brown spots. The bird is generally about seven inches long; it has no song worthy of notice, and is not a common bird with us, although it is to be met with in England. (*See* Fringillidæ.)

Grouse, *growse,* (Ang.-Sax.,) a species of game-bird which belongs to the family of the Tetraonidæ. The bill is rather short, broad at the base, compressed and arched, with the tip obtuse, the nostrils being placed at the base of the bill, and protected with feathers, or a hard scaly substance; the legs are stout, with the tarsi naked and scutellate, but sometimes covered with feathers to the toes; the hind toe, which is rarely wanting, is rather small and elevated, the wings short and rounded, and the tail also rounded at the extremity. These birds live chiefly on the ground, on which they can run with great swiftness, and they feed principally on vegetable substances, such as berries, seeds, and the buds of trees and shrubs. They vary greatly in size, some being nearly as large as a turkey, while others scarcely exceed a pigeon in size. There are several varieties of the grouse. The most important bird of this class is called the capercailzie, or wood-grouse. (*See* Capercailzie.) To speak correctly, however, the black-cock (*Tetrao tetrix*) is one of the largest species of grouse which can be termed truly British, as it is found both in England, Scotland, and Ireland. The form of the tail is one of the most peculiar features in this bird, as the four outer feathers are considerably elongated and curved outwardly at the tip, so that the tail has the appearance of a double hook. In its habits and other characteristics, the black-cock strongly resembles the capercailzie. The common grouse, or ptarmigan, (*Lagopus vulgaris,*) is another variety of this species, and the feathers of this bird extend to the very extremity of the toe. Like the preceding classes, it feeds on berries and the small shoots of plants; and, unlike them, it is not polygamous, the males and females pairing regularly in the breeding season. The red grouse (*Lagopus scoticus*) is peculiar to these islands, and inhabits all heathy districts, whether lowland or mountainous; whilst the ptarmigan (*Lagopus vulgaris*) only inhabits very hilly countries, as the northern parts of Europe, and the mountainous regions of Spain and Italy. The red grouse is the same colour in plumage all the year round, whilst the ptarmigan acquires a white habit in the winter months. The red grouse is a most prolific bird, and it is wonderful how it can exist in such large numbers, when it is considered what quantities are shot every season to supply the London market between the months of August and April.

GRUB, *grub*, (Ang.-Sax.,) a small worm: it is a name, however, more properly applied to the hexapod worms produced from the eggs of beetles, &c., which are eventually transformed into winged insects. (For further information, *see* PUPA.)

GRUS. (*See* CRANE.)

GRYLLUS. (*See* CRICKET.)

GRYSBOK, *gris'-bok*, (*Calotragus melanotis*,) a pretty South African antelope, about nineteen inches in height, and of a warm chestnut colour, flecked with white.

GUANACO. (*See* LLAMA.)

GUDGEON, *gud'-je-on*, (Fr. *goujon*,) (*Cyprinus Gobio*,) a sort of malacopterygious freshwater fish, inhabiting the waters of English rivers, as the Thames, Mersey, Avon, Kennet, and Colne, which produce remarkably fine specimens. The gudgeon is about six to eight inches long, and half-cylindrical in shape; its back is pale brown spotted with black, the belly white, and the tail forked. The gudgeon swims in shoals, and feeds on worms and aquatic insects. They afford great sport to anglers, from their greediness in seizing upon any bait presented to them. They spawn in May, generally in shallow water, to which they repair for the purpose.

GUENONS, a popular name for the small, long-tailed monkeys of Africa, including the grivet, vervet, and others.

GUEPARDA. (*See* CHETAH.)

GUEREZA, a beautiful Abyssinian monkey, with long black and white hair. It belongs to the genus Colobus.

GUILLEMOT, *gill'-e-mot*, (*Uria troile*,) a common British sea bird, which breeds in great numbers on rocks. It is allied to the Penguins.

GUINEA-FOWL. (*See* FOWL.)

GUINEA-PIG, (*Cavia cobaya*,) is an animal of the genus Rodentia, a native of South America, but which is now quite domesticated in Europe. From the beauty of its appearance, this animal seems to have attracted the attention of Europeans. It is one of the species called Agoutis, which are well known in South America and the West India Islands. Its ears are large and broad; the upper lip is divided in two, and the hair or fur is erect, and somewhat resembling that of a pig, (whence its name.) The colour of the guinea-pig is generally white, with black spots, although this is somewhat variegated by orange blotches on the coat. It has five toes on the fore legs and three on the hind ones, and it is utterly destitute of any tail. In their habits guinea-pigs are extremely neat, as they are constantly seen smoothing and arranging the hair which forms the outer tegument of their coat. Their general voice is a grunt or feeble squeal, which renders them even more analogous to the pig, to which they are so often likened. The guinea-pig, in its wild state, inhabits dry sandy places, and its flesh is esteemed a great dainty by the natives of South America.

GULL, *gull*, (Welsh *gwylan*,) is a Linnæan species of aquatic birds, belonging to the longipennate division of *Palmipedes* in Cuvier's system. The birds of this web-footed well-known marine genus are dispersed over every part of the globe, and in some places, at certain seasons of the year, are met with in multitudinous quantities. Their characteristics are as follow:—A strong straight bill; the body clothed with a great quantity of down and feathers, which give these birds an appearance of greater bulk than their weight warrants; the legs are small and naked above the knees, and the feet are webbed. The gulls, which are seen on the different coasts, mostly assemble in flocks, and are characterised by the greediness and gluttony which seems natural to all sea-birds. There are several varieties of the gull. The common gull, or *Larus canus*, is the most numerous by far of the different genera. It generally measures about seventeen inches in length, by thirty-six in breadth, and it frequents the ledges of cliffs which overhang the sea round the coast. The bill is yellow, the back gray, the head, neck, tail, and under part of the body perfectly white, and the legs are a dull white, tinged with green. It eats any sort of carrion which comes in its way, but its more general diet is fish, which it catches whenever in want of food. This gull is a great scourge to the herring-shoals which frequent the waters round our coasts. The gull is a very courageous bird, and there are many anecdotes related of the encounters witnessed between it and some large fish which it has selected for a prey, but which proves too strong for its assailant. The black-backed gull, the ivory gull, and the horny gull, have but little distinction from the common gull. The Skua gull is about the size of a raven; the back and head, and upper parts of the body, are of a deep brown colour, the under parts pale ashy gray; the legs black, and the talons very strong and hooked. It is a native of the North, although occasionally found in England. It is a very formidable bird, partaking of the fierceness of the eagle, and not only feeds on fish, but it also preys on lambs and other small animals. In the Shetland isles, and in other northern rock-bound coasts, it is seen often. The Arctic gull is very similar to the common gull, and needs no special signification. It is found in northern regions,—whence its name, and it is peculiar only from the fact of its parasitical propensities. It never fishes for itself, like other water-fowl, but pursues smaller gulls which have captured any booty, and makes them drop it. It then descends with great impetus, and catches its stolen prey before it can reach the water.

GULO. (*See* GLUTTON.)

GUM, *gum*, (Sax. *goma*,) in Anat., is that cellular and elastic fleshy substance which covers the alveolar portions of the upper and lower jaws, and envelops the neck of the teeth.

GUNNEL, SPOTTED. (*See* BUTTER-FISH.)

GURNARD. (*See* TRIGLA.)

GYMNETRUS. (*See* RIBBON-FISH.)

GYMNOCEPHALUS. (*See* FRUIT-CROW.)

GYMNOPHTHALMATA, *jim-nof-thal'-măt-a*, a tribe of medusæ, having a disk-shaped body, circulating vessels running to the margin, and the eye-specks either uncovered or wanting.

GYMNORHINA. (*See* PIPING-CROW.)

GYMNOTUS ELECTRICUS. (*See* ELECTRICAL EEL.)

GYMNURA, *jim-new'-ra*, a curious Sumatran animal, allied to the Shrews. It is also called the Bulau, or Tikus. It has a long, slender muzzle, a long and naked tail, short ears, and long, harsh hair, projecting from the shoulders and pointing backwards.

GYPS. (*See* VULTURE.)

GYR-FALCON. (*See* GER-FALCON.)

GYRINUS. (*See* WHIRLWIG.)

H.

HABITAT, in Zool., is a term used to express the natural abode or locality of an animal.

HACKEE. (*See* SQUIRREL, CHIPPING.)

HADDOCK, *hăd'-dock*, (Irish *codog*,) a subbrachial malacopterygious fish, belonging to the family Gadidæ. It is almost as well known, according to Yarrell, as the cod; and from the quantity taken of it at numerous localities around our coast, and the facility with which the flesh can be preserved, it is a fish of some considerable value. The haddock swims in immense shoals, which are in the habit of entirely changing their stations when they visit our coast: they are more abundant from Yarmouth to the Tyne, however, than elsewhere. They are caught with long lines and handlines, and their favourite bait is a herring. The common weight of the fish is about from two to four pounds, although there have been several instances of some weighing as much as ten pounds being seen in the London market. It is said that the haddock is the *asinus*, or *onos*, of the ancients; and there is a superstition which ascribes the dark stripes over the shoulders of this fish to the impression left by St Peter when he took the tribute-money out of the mouth of one of its species: unfortunately, however, for this superstition, the haddock does not exist in the Sea of Galilee, which is fresh water. The length of the haddock is generally about twenty inches. The body is lance-shape, and the head slopes suddenly from the crown to the point of the nose, which latter projects beyond the mouth. The colour is throughout a dullish gray, with the exception of the belly, which is white.

HÆMATOPINUS. (*See* TICKS.)

HÆMATOPUS. (*See* OYSTER-CATCHER.)

HÆMATOZOA, *he-mă-to-zo'-ă*, (Gr. *haima*, blood; *zoön*, a living being,) a term applied to the animalcules, or entozoa, which exist in the blood of mammals, birds, reptiles, fishes, and many invertebrate animals. They are generally microscopic, without generative organs, and found existing in the blood circulating both in the arteries and veins. A very small proportion attain a large size and have organs of reproduction; these are generally found in some special part of the body. Thus the variety called *Distoma hæmatobium* is only found in the abdominal venous system; another variety is found restricted to the abdominal arterial system of the horse; and the *Pseudalius filum* is only found in the pulmonary artery and branches of the porpoise. Very little is known concerning the origin of these entozoa. It seems probable that some of the minute forms are the larvæ of a worm living in the organs surrounding the vessels. The most important of the human hæmatozoa is the variety mentioned above: it has only been observed in Egypt. The liver-fluke (*Distoma hepaticum*) has sometimes been found in the interior of the portal vein. Those hæmatozoa which have been found in tumours must have been conveyed there by the blood. Horses and dogs are frequently affected with these parasites; in the case of the latter animal, they are seldom large enough to be visible to the naked eye. The presence of hæmatozoa does not, however, seem to affect the general health of either men or the other animals.

HÆMULON. (*See* CAPEUNA.)

HAIR, *hair*, (Sax. *hær*, Ger. *haar*,) in Anat., is applied to the small cylindrical, transparent, insensible, and elastic filaments which arise from the skin, and are attached to it by means of small roots. Hair is found to grow on all parts of the surface of the human body, except the palms of the hands and the soles of the feet. Hair, being a bad conductor of heat, serves to keep the surface of the body warm, as well as to protect it from the influence of external heat, moisture, and electricity: it thus performs an important part in the animal economy. Hair differs considerably in length, thickness, shape, and colour, according to situation, age, sex, family, or race. Hair is divided into two kinds: long, which arises on the scalp, cheeks, chin, breasts, &c., of men; and short, which exists over most other parts of the body, and is much softer than the other. A hair is composed of two parts: a shaft and a bulb; the former being that part which rises above the surface of the skin, the latter that which is inserted in the skin. The bulb is inserted in a follicle in the cutis, or true skin, the follicle being, like the hair which is inside of it, bulbous, or larger at the lower part. The hair grows from the bottom of the follicle, being formed by the secretions of cells which line the sides of the follicles. Hair is composed of an outer cortical, fibrous, or horny substance, which invests it, and an inner medullary or pith-like substance within. The cortex, or bark of the hair, is composed of a single layer of cells, which overlap each other, and give a serrated appearance to the hair when seen under the microscope. The central portion is made up of a series of cells filled with pigment. The colour of the hair seems to depend on the presence of a peculiar oil, which is of a blackish-green colour in dark hair, blood-red in red hair, and nearly colourless in white hair. The gray hair which attends old age is the result of a deficient supply of pigment. Well-authenticated cases are given even of young persons, whose hair has become gray, even in a single night, in consequence of some strong mental excitement: as fear, sorrow, &c. Various attempts have been made to explain this phenomenon, but no satisfactory solution of the difficulty has been arrived at. Some races and persons are noted for the length and luxuriance of their hair, while in others it is very deficient. In some races, as the Kurilian, it grows nearly the length of the whole body.

GORILLAS.

HAJE, *hah'-jee*, a name for the African cobra, or hooded snake. (*See* HOODED SNAKE.)

HAKE, *haik*, (Ang.-Sax.,) *Merlucius vulgaris* of Cuvier, a species of fish belonging to the Gadidæ or Cod family. Its generic characters are,—head flattened; body elongated; the back furnished with two dorsal fins, the first short and the second long; one anal fin, and no barbule at the chin. It inhabits the seas of North Europe and the Mediterranean, and, although somewhat scarce off the coast of Scotland, it is found most abundantly along the southern coast of England, Portsmouth receiving the greatest supply of this fish. Yarrell, in his "History of British Fishes," states that "the hake may be traced nearly all round the coast of Ireland; and it is so abundant in the Bay of Galway, that, according to a recent writer, this bay is named in some ancient maps the *Bay of Hakes*. On that part of the Nymph Bank off the coast of Waterford, this fish is also so plentiful that 1000 have been taken by six men in one night. It is a voracious fish, as its systematic name of *Merlucius*, sea-pike, implies. It is a coarse fish, not admitted to the tables of the wealthy; but large quantities are annually preserved both by salting and drying, part of which is exported to Spain." The colour of the hake is a dusky brown on the upper part of the body, with a lighter shade of the same colour below; the dorsal and caudal fins dark, and the ventral and anal fins pale brown.

HALIAËTUS. (*See* EAGLE, SEA.)

HALICORE. (*See* DUGONG.)

HALIOTIS, *hal-i-o'-tis*, a genus of univalve shells, commonly called Sea-ears. The ormer-shell of Jersey belongs to this genus.

HALLUF. (*See* HOG.)

HALMATURUS. (*See* WHALLABEE.)

HAMMER-SHELL. (*See* MALLEUS.)

HAMSTER, *ham'-stir*, a small rodent animal inhabiting many parts of Northern Europe, (*Cricetus frumentarius.*) It is a most destructive creature, carrying off great quantities of wheat, beans, and other crops, and laying them up in its burrow. One hamster has been known to lay up a hundredweight of beans in its subterranean treasury. These stores are intended to supply it with food during the winter months.

HAND, *hănd*, (Ger. *hand*, Lat. *manus*,) in Anat., is the lower portion of the superior extremity, the great organ of touch and prehension. "In many respects," says Dr George Wilson, "the organ of touch, as embodied in the hand, is the most wonderful of the senses. The organs of the other senses are passive; the organ of touch alone is active." "The hand selects what it shall touch, and touches what it pleases. It puts away from it the things which it hates, and beckons towards it the things which it desires." "Moreover, the hand cares not only for its own wants, but when the other organs of the senses are rendered useless, takes their duties upon it." "The blind man reads with his hand, the dumb man speaks with it; it plucks the flower for the nostril, and supplies the tongue with objects of taste. Not less amply does it give expression to the wit, the genius, the will, the power of man. Put a sword into it, and it will fight; a plough, and it will till; a harp, and it will play; a pencil, and it will paint; a pen, and it will speak. What, moreover, is a ship, a railway, a lighthouse, or a palace,—what, indeed, is a whole city, a whole continent of cities, all the cities of the globe, nay, the very globe itself, so far as man has changed it, but the work of that giant hand with which the human race, acting as one mighty man, has executed its will."—(*Five Gateways of Knowledge.*) The hand is that which distinguishes man in the class of mammals, he being the only animal possessed of two hands, (*bimana.*) That which constitutes the hand, properly so called, is the power of opposing the thumb to the other fingers, so as to seize upon the most minute objects. The hand is composed of a number of small bones, twenty-seven in all, so arranged as to combine the greatest possible degree both of strength and flexibility. These are arranged in three divisions: those of the carpus, metacarpus, and phalanges. The carpus, or wrist, comprises eight bones, arranged in two rows, four in each; and are the scaphoid, navicular, or boat-shaped bone; the semilunar, or half-moon; the cuneiform, or wedge-shaped; the pisiform, or pea-like; the trapezium; trapezoid; os magnum, or great bone; and the unciform, or hook-shaped. The metacarpal bones are five in number, and constitute the bones of the palm and back of the hand. The phalangeal bones are fourteen in number, three for each of the four fingers, and two for the thumb. They are named in their numerical order from above downwards; *i e.*, from the palm of the hand. The inferior extremity of the radius and ulna articulate with the scaphoid, semi-lunar, and cuneiform bones of the first row of the carpus. The articulations between the first and second rows of the carpal bones are very remarkable. These articulations are connected by numerous ligaments running in various directions, by means of which the bones are kept in their proper positions. The second row of carpal bones articulate with the metacarpal, and form the carpo-metacarpal articulations. They are connected by dorsal and palmar ligaments, stretching from the carpal to the metacarpal bones. The metacarpo-phalangeal and inter-phalangeal articulations are similarly formed, and are connected by lateral ligaments on each side, and a strong ligament in front. Besides these, there are the various muscles of the hand, which give to it its several motions of flexion, extension, abduction, adduction, and circumduction. The hand is also richly supplied with blood-vessels and nerves.—To such as desire a particular account of the wonderful structure of this portion of the human frame, we would recommend Bell's excellent treatise "On the Hand."

HARE, *hair*, (Sax. *hara*, Lat. *lepus*,) one of the Leporidæ, a family of mammalia belonging to the order Rodentia, or Glires, and characterised by having two small teeth behind the upper cutters, and five rootless grinders, each formed of two plates in both jaws. Hares have large lustrous eyes placed laterally, long ears, a hairy tongue, an incomplete clavicle, weak fore-feet, and a very short hairy tail. In disposition, they are gentle, timid animals, and, being possessed of remarkably quick hearing, are frightened at the least noise. Their mode of progression mostly is by a series of leaps, and their flight, when alarmed, is rapid in the extreme. They live on vegetable food, as the young shoots and bark of trees, growing corn, and other similar substances. They are very prolific, and were it not for the multitudes which are annually shot, or otherwise slaughtered, for the London market, they would soon overrun the country. Hares form a great object for pursuit on the part of sportsmen, and hunting them with the greyhound is termed "coursing." (*See* GREYHOUND.) They exist in Europe, America, Asia Minor, Syria, and in fact in nearly all countries; and, of course, there are many varieties of their conformation. The young are called "leverets," and the nest of a hare, or the place in which it reposes during the day, is termed its "form." The Romans, it is said, prized the hare very much as an article of food; but it was forbidden to the Jews, the Mohammedans, and, it is also stated, to the ancient Britons. As the common hare is the type of the recognised family, it alone has been selected for the subject of the present article; but further information regarding the different varieties will be found under the separate articles headed LEPORIDÆ and LAGOTIS.

HARE, SEA. (*See* APLYSIA.)

HARPA, *harp'-a*, a genus of marine shells allied to the whelk, and commonly called Harp-shells, because their curved outlines have some resemblance to the shape of a harp, and their deep longitudinal ridge represent the strings.

HARPALUS, *har'-păl-us*, a genus of beetles belonging to the family Caralidæ. They have the first three or four joints of the tarsi of the two anterior pairs of legs heart-shaped and flattened.

HARRIER, *hăr'-e-er*, (Ang.-Nor.,) is a species of hound employed in hunting the hare. This animal is supposed to be a cross between the foxhound and the beagle, and is remarkable for its sagacity in tracing, and the boldness with which it pursues its game. There are three prominent varieties in the harrier, according to Blaine, in his "Rural Sports;" namely, the old southern hound, the modern harrier, and the beagle. Many subordinate divisions, however, accrue, and a cross-breed is used for otter-hunting. The modern harrier, in appearance, is little more than a dwarf foxhound. In choosing a pack of harriers, their size and form should be adapted to the country which they are to hunt over; some sportsmen appear to have a *penchant* for those that are undersized, as the open lands about Dorchester used to be hunted with a pack of seventeen couple, none of which were more than seventeen inches in height. Mr. Beckford states that the hounds most likely to show the best sport are those produced by a cross between the large slow hunting-harrier and the little fox-beagle; the former having a good scent, and the latter being fleet of foot; and they thus produce a hound which possesses both advantages.

HARRIERS, *hăr'-e-ers*, a group of falcons, in which the feathers round the eyes radiate in a manner somewhat similar to those of the owls. The harriers all fly low, and frequently quarter the ground like well-trained dogs. The Hen-harrier (*Circus cyaneus*) is a well-known British example.

HART. (*See* DEER.)

HARTEBEEST, OR LECAMA, *hart'-y-beast*, a splendid antelope of South Africa, (*Alcephalus Caama.*) The horns lyrate, thick and knobbed towards their bases, and near the tip turn suddenly backwards nearly at a right angle. It is gregarious, and lives in little herds, each being led by an old male. It is rather heavily made, and not so active as the generality of antelopes.

HARUJA. (*See* HOG.)

HARVEST-BUG, a minute scarlet mite, (*Septus autumnalis*,) which lives among grass and herbage, but which burrows into the human skin, and causes great irritation. Horses and dogs are also affected by this arachnid, and even the thick fleece of the sheep cannot preserve it from the harvest-bug.

HATCHING, *hătsh'-ing*, (Ger. *hecken*, to hatch,) the incubation or lying down of an animal upon her own or another's eggs, and so communicating to them heat By this means she maintains them at her own temperature, a condition essential to their development. The development of the fœtus takes place in many animals after the exclusion of the egg, and while it is kept in external contact with the parent's body, as in the case of the crab and lobster tribes, beneath the caudal plates; or agglutinated to the surface of the abdomen, as in certain species of pipe-fish; or concealed in cutaneous marsupial cavities, as in other species of the Syngnatus and the Hippocampus: in the case of those cold-blooded animals, however, the protection of the ova seems to be the object, and not communication of warmth. True hatching, or incubation, only takes place among the oviparous warm-blooded animals; namely, birds. A due degree of warmth is absolutely necessary in hatching. The mean temperature required is 100° Fahr.; it may vary from 95° to 105°, and towards the close of the process may be suspended for one or two hours, or even for a longer period, according to the amount of extraneous heat which the exposed eggs receive. The power which birds possess of communicating the proper amount of heat to their eggs, depends upon a peculiar plexus of vessels distributed over the skin of the abdomen, which in most birds is connected with a derivation of blood from the internal organs of generation. The uncontrollable propensity which birds have to incubate arises from the vascular, hot, and sensitive condition of the abdomen. The eggs of the bird present several peculiarities in relation to the circumstances under which the fœtus is to be developed. By their oval form, they present a large surface to the source of heat, while the hard calcareous nature and arched form of the shell preserve them from injury from the incumbent pressure of the parent bird. The shell is also porous, which assists the heat and air to pass into the egg, and the germ is surrounded by a sufficient store of nutritive matter. This matter is of two kinds: the internal part, called the yoke; and the external, called the white, or albumen, which entirely disappears during the process of hatching. The germ is situated at the superficies of the yolk, beneath the membrane, in the circular opaque white spot usually called "the tread." The period of incubation is generally in proportion to the size of the bird; but the degree of development at which the young bird arrives differs in various species. Many birds show wonderful instinct in the manner in which they prepare their nests, not only for the process of hatching their young, but also for their protection and warmth after being hatched. The practice of artificial hatching was well known in ancient Egypt and China. At the present day, artificial hatching by means of ovens, stoves, or steam, is greatly used in the former country. It has been calculated that nearly 93,000,000 chickens are annually hatched in the ovens of Egypt. The French philosophers have bestowed considerable attention upon artificial hatching, and one of the best results of their labours was the *Eccaleobion*, or egg-hatching machine, exhibited in London some years ago.

HAWFINCH. (*See* GROSBEAK.)

HAWK, *hawk*, (Sax. *hafoc*,) a term applied in Orn. to the Accipitrinæ, a sub-family of the Falconidæ. The birds of this family are distinguished by the shortness of their wings, which extend no farther than two-thirds the length of their tail. The fourth quill-feather is the longest, the first, second, and third gradually exceeding each other in length. The beak is short, and hooked from the base; and the upper mandible, though not furnished with distinct teeth, like the true falcons, has the festoon, or prominence, that generally supplies its place, more strong and angular than is usual among these tribes. Hawks are generally natives of cold climates; they skim the ground with a low and rapid flight, sometimes seizing their prey upon the wing, and sometimes swooping upon it from above. The common sparrow-hawk may be taken as a type of the family. It is to be found in nearly every part of Europe, and its range extends from Russia to the Cape of Good Hope: it is also to be found in Japan. In Great Britain, it has the reputation of being the most destructive of all the native rapacious birds. It is generally to be found in wooded neighbourhoods, and preys upon partridges, pigeons, &c., and is the terror of the poultry-yard. The female sparrow-hawk is nearly fifteen inches in length, and the male about three inches shorter. Their nest is built in high rocks, lofty ruins, or hollow trees; but their eggs are frequently laid in the deserted nests of crows or other birds. In former times this bird was used in falconry, and was considered the best hawk for landrails. In ancient times it was held in high estimation by the Egyptians, amongst whom it was an emblem of Osiris; the Greeks consecrated it to Apollo. The goshawk is a larger species than the sparrow-hawk, and is also found in many countries. (*See* GOSHAWK.) There are many other species of hawks, such as the *Accipiter dukhuniensis*, found in the Deccan; others, such as the *Herpetotheres cachinnans*, found in America. In South America there are several varieties, and a collared sparrow-hawk, which possesses all the destructiveness and courage of its European ally, is found in Tasmania. In Africa, a sparrow-hawk (*Nisus musicus*) has been observed, which is commonly called the Chanting Falcon. It is the only raptorious bird gifted with the power of song; but its notes can hardly be called harmonious or musical; its voice is simply a little clearer than usual; but it seems to have a high notion of its own powers; for it will sit for half a day, perched on a tall tree, uttering its unceasing cry.

HAWK-MOTHS, *hauk'-moths*, a group of moths which fly very rapidly, have long, powerful, and sharply-pointed wings, and long probosces.

HEAD. (*See* BRAIN, ANATOMY.)

HEART, *hart*, (Sax. *heort*, Lat. *cor*,) in Anat., the great central organ of the circulation of the blood, is a hollow muscular organ in the form of an irregular cone, and placed obliquely in the lower or front part of the thorax, inclined most to the left side. The base is directed towards the spine, and corresponds with the fourth and fifth dorsal vertebræ, while the apex points between the cartilages of the fifth and sixth ribs on the left side. It rests upon the diaphragm, having the lower surface somewhat flattened. It is enclosed in a membranous bag, called the pericardium, but loosely, so as to allow free motion. The heart may be considered as double, the right side being pulmonary, and serving to transmit blood only to the lungs; the other systemic, forcing the blood into all parts of the system. It contains four cavities,—two at the base, termed auricles, and two at the apex, named ventricles. The right auricle has four apertures,—one from the superior vena cava, by which the blood is returned from the upper portion of the system; one from the inferior vena cava, returning the blood from the lower parts of the system; one from the coronary vein, by which the blood is returned from the heart itself; and one into the right ventricle. The blood passes from the right auricle into the right ventricle, the entrance to which is guarded by a fold of the lining membrane, forming a valve, called the tricuspid, from its presenting three points. The blood is sent from the right ventricle into the pulmonary artery, by means of which it is conveyed to the lungs. The entrance to the pulmonary artery is guarded by three semilunar valves, which prevent the blood from again flowing back into the ventricle. The blood is returned from the lungs to the heart by the pulmonary veins, which convey it into the left auricle. From this it is sent into the left ventricle, the entrance into which is guarded by the mitral, or bicuspid valve, consisting of two pieces, of which the right one is much larger than the other. The left ventricle has its walls much thicker than the right, and forces the blood into the aorta, for distribution over the entire system. At the commencement of the aorta, there are three sigmoid or semilunar valves, as in the pulmonary artery, for preventing the blood from returning. The heart of a fœtus differs from that of an adult, in having a foramen ovale, through which the blood passes from the right auricle to the left. The exterior fibres of the heart are longitudinal, the middle transverse, and the interior oblique. The contraction of the heart is termed systole; its dilatation, diastole.

HEDGEHOG, *hedje'-hog*, (*Erinaceus europæus*,) a genus of animals belonging to the class Mammalia, order Feræ, and family Talpidæ. It is found in most parts of Europe and Asia, and also in South Africa, from which latter country a specimen of the *Erinaceus frontalis* has been placed in the British Museum. The hedgehog is known by its body being covered with spines, and its possessing the faculty of rolling itself up into a ball, protected by these same spines, when pursued; and it will not disengage itself until the danger has passed. It is generally about nine inches in length; its muzzle is pointed; its tail short; the head very conical; ears short, broad, and rounded;

each foot five-toed, and armed with long claws; eyes prominent; body oblong, and conical on its upper surface; and its legs are short, and nearly destitute of any covering. Its colour is usually of a grayish-brown; and it is a nocturnal animal, while in the winter it burrows in the earth and becomes torpid. Its usual food is composed of beetles, slugs, and snails; and from its fondness for insects, and its nocturnal habits, it is often kept domesticated in London to destroy cockroaches and black-beetles. A foolish idea at one time prevailed, that the hedgehog was in the habit of sucking the udders of cows during the night time, which is naturally without foundation. Another charge is also laid against this little animal, as it is said to be a great destroyer of the eggs of game-birds. Its flesh is well-flavoured, and it is eaten on the continent, although few but gipsies consume it in England. There is another species, the long-eared hedgehog, (*Erinaceus auritus*,) which is found in Siberia, and has ears two-thirds as long as the head. The limbs are longer and more slender than in the European species. For Madagascar hedgehog, *see* Tanrec.

Helarctos. (*See* Bear.)

Heliconiidæ, *hee-lĭ-kone-i′-ĭd-ee*, a family of butterflies, in which the club at the end of the antennæ is very small, the central cell of the hind wings is closed, and the legs are very slender. They all inhabit hot countries, and in the typical genus Heliconia, the wings are nearly transparent.

Helix. (*See* Snail.)

Hellbender, *hel-bend′-er* (*See* Menopome.)

Hemigale, *hĕm-ig′-al-lee*, a pretty viverrine mammal, remarkable for the row of broad dark stripes which cross its back.

Hemiptera, *he-mip′-ter-ă*, (Gr. *hemi*, half; *pteron*, wing,) an order of haustellated insects having their wing-covers formed of a substance intermediate between the elytra of beetles and the other ordinary membranous wings common to most insects. When the Hemiptera quit the egg, they have the appearance of small hexapod larvæ, differing but little from the perfect insect, save in the absence of wings; and before these latter are acquired, the skin is shed several times, and the larva acquires a much larger bulk. The bed-bug (*Cimex lectularius*) and the water-boatman (*Notonecta*) are examples of the family of Hemiptera.—*Ref.* Baird's *Cyclopædia of the Natural Sciences.*

Hepoona Roo, *hĕp-oon′-ah-roo*, one of the flying marsupials, found in New Holland, and sometimes called the Great Flying Phalangist. It is rather variable in colour, but is generally grayish-brown above, and yellow-white below. Like others of its kind, it can spring through a very great distance, by expanding the skin of its sides.

Hermit Crab. (*See* Crab.)

Heron, *her′-on*, (Fr.; Lat. *ardea*,) belongs to the class Grallatores, a family of birds of which the common heron (*Ardea cinerea*) is the general type. The characteristics of the Ardeidæ are as follows:—Beak long, strong, straight, compressed in a lengthened cone; upper mandible slightly channelled, ridge rounded; nostrils lateral, basal, pierced longitudinally in the groove, and half-closed by a membrane; legs long, slender, naked above the tarsal joint; three toes in front, the two outer united by a membrane, one toe behind directed inwards; claws long, compressed, sharp, the middle claw denticulated on the inside; wings of moderate length, the first quill-feather a little shorter than the second or third, both of which are the longest in the wing. The common heron is one of the most numerous, as well as the best known of wading birds, and formerly the bird was considered royal game, and statutes were passed for its preservation. The heron is said to be very long-lived, and was formerly held in considerable estimation as an article of food. It visits most parts of the United Kingdom, and occupies the heronries, which are preserved for its comfort, from spring until the month of August. It visits Scandinavia in summer, going occasionally as far north as the Faroe Islands, Iceland, and the southern coast of Greenland; but it is most abundant in Holland. The plumage is usually of a bluish-ashy colour, and the average length of the bird from the point of the beak to the end of the tail about three feet, while from the carpal joint to the end of the wing, the extent is about seventeen inches. The solitary habits of the heron are well known, for, except during the breeding season, when they congregate in large flocks, they are generally seen alone. Their food is nearly entirely composed of fish, and they will be seen standing for hours by the side of ponds and streamlets, watching for their prey, which they catch by a single dart of their powerful beak. Besides the common heron, there are the Purple heron, which is found in the temperate parts of Europe, in Africa, and Asia; the Great White heron, an accidental visitor to this country, but common in the eastern parts of the Mediterranean; the Buff-backed heron, and the Squacco heron, a native of Egypt.—For further information on these latter varieties, the reader is referred to Yarrell's "History of British Birds," which treats at length on the subject.

Herpestes. (*See* Ichneumon.)

Herpetology, *her-pe-tol′-o-je*, (Gr. *herpeton*, a reptile; *logos*, a discourse,) a term applied to that portion of natural history which treats of reptiles. This branch of science has received the attention of naturalists both in ancient and modern times. Linnæus gave much study to the subject, and Ray devoted considerable time to it. Lacépède, Brongniart, Latreille, and Dandin also contributed to its advancement in the end of the eighteenth and beginning of the nineteenth century. In later times the principal writers on herpetology have been Sklegel, Gray, Müller, Owen, and others. Additional interest is added to the study of this branch of science on account of the numerous fossil remains of reptiles belonging to former geological periods which have been found. Many of these possess extraordinary characters, and are of immense size. Until lately, the Batrachia, or Amphibia, have always been included with the reptiles; consequently, in most works on herpetology, a description of them is to be found.—*Ref.* Bell's *History of British Reptiles*, which contains a full account of all the British species, including the Amphibia.

Herring, *her′-ring*, (Ger. *heer*, an army, on account of the great numbers in which they visit our shores,) belongs to the family of the Clupeidæ, a branch of the order termed Malacopterygii, on account of their being possessed of a scaly body like the salmons, no adipose dorsal fin, and by the upper jaw being formed in the middle by the intermaxillary, and on the sides by the maxillary bones. The length of the head, compared to the length of the body alone, without the head or caudal rays, is as 1 to 4; the depth of the body compared to the whole length of the fish, as 1 to 5; the commencement of the dorsal fin is halfway between the point of the upper jaw and the end of the fleshy portion of the tail; the longest ray is nearly as long as the base of the fin; the pectoral fin being rather large compared to the size of the other fins. The ventral fin arises considerably behind the line of commencement of the dorsal fin, and is small, with elongated axillary scales, its origin halfway between the point of the lower jaw and the end of the short central caudal rays. The anal fin begins halfway between the origin of the ventral and the end of the fleshy portion of the tail, and extends over half the distance between its origin and the end of the fleshy portion; thus occupying the third quarter division of the distance between the origin of the ventral fin and the end of the fleshy portion of the tail. The rays are very short; the tail considerably forked, with the outer rays double the length of the middle ones. The lower jaw is much the longest; the dorsal and abdominal lines of the body slightly convex; the belly carinated, but not serrated; the scales moderate in size, oval, and thin. The upper part of the fish is a fine blue colour, with green and other reflections, when viewed in different lights; the lower part of the side and belly, and the gill-covers, silvery white, exhibiting the appearance of extravasation when the fish has been dead some twenty-four hours. The dorsal and caudal fins are of a dusky hue, and those on the lower parts of the body almost white. Such are the characteristics of the herring, according to Yarrell, who, in his account of British fishes, enters at large upon the subject. The herring is a constant visitor to our shores, where it continues some months.—*Ref.* Yarrell's *History of British Fishes;* Baird's *Cyclopædia of the Natural Sciences.*

HERRINGS, KING OF. (*See* CHIMÆRA.)

HETEROPTERA, *hĕt-er-op-ter-ra*, an order of insects with four wings, having the basal part leathery, and the rest membranous. The front pair are largest, and partially overlap each other. The body is flattish.

HIBERNATION, *hi-ber-nai'-shun*, (Lat. *hibernus*, wintry,) a term applied to that state in which certain animals pass a portion of each year in a more or less complete suspension of their customary functions. As this is frequently observed during the severity of winter, it has been designated hibernation. In the tropics, however, the hottest and driest weather produces the same effect, and causes many reptiles, and some insectivorous animals, to pass into a state of torpidity or inactivity, till the rainy season commences. In fact, hibernation depends less upon the alternation of temperature than on the abstraction of the means of subsistence dependent upon it. The continued application of cold to some animals induces a suspension of their active faculties, and their hibernation may be dissolved by artificial heat: it is evident, however, that this state is not the consequence of a low temperature. Without hibernation, or some similar law, insectivorous animals, in high latitudes and tropical climates, could not exist. In complete hibernation, on the approach of the season, the animals retreat to their places of temporary concealment; there their vital functions begin to be more slowly performed; they cease to eat, breathe slower, until finally their respiration seems to be totally suspended. The movements of the heart become more and more languid, and are performed at longer intervals of time; the animal heat is much diminished; and, lastly, profound insensibility takes place. In this country the bat and the hedgehog present the best examples of hibernating animals. When the cold season sets in, and there are no insects in the air, and when other insects have burrowed into the earth or concealed themselves, the bat and the hedgehog would starve if it were not for their hibernation. The bat retreats to his cave, and suspends himself in a state of dormant existence; and the hedgehog creeps to his concealed nest, and sinks into deep repose. In some other European mammals the hibernation, though somewhat analogous, is not so complete. The dormouse, the squirrel, and the marmot, lay up stores of vegetable food in their winter retreats; but the insensibility in these animals is less profound, and the respiration never wholly suspended. During six months of torpidity, the Alpine marmot only makes 71,000 inspirations, while in its active state it makes 72,000 in forty-eight hours. The ordinary bear also passes a large portion of the winter in deep sleep without food. Many genera of the family Mus also exhibit the same peculiarity. All these animals become fat in the autumn, which appears to supply the waste of the system during hibernation. Snakes, lizards, toads, frogs, and other cold-blooded animals, remain in a complete state of torpor during the winter. The lips of frogs are glued together, and they lie buried in mud at the bottom of stagnant water. The snakes and lizards of North America are hibernating animals, as with us, but in warmer climates they are active throughout the year. Insectivorous birds are less subject to hibernation than mammals in cold climates, since they are able to migrate easily to regions where insect food can be procured.

HIMANTOPUS. (*See* STILT PLOVER.)

HIPPIDÆ, *hip'-id-dee*, a family of crabs in which the carapace is long, round, and rather thimble-shaped, and the abdomen is very small.

HIPPOCAMPUS, *hip-po-kăm'-pus*, (Gr. *hippos*, horse; *kampto*, I bend,) the *H. brevirostris* of Cuvier, a species of lophobranchiate fish, belonging to the family of the Syngnathidæ, which is known in England by the appellation of the Sea-horse or Pipe-fish. Its generic characters are: jaws united and tubular, like those of the Syngnathi; the mouth placed at the end; the body compressed, short, and deep; the whole length of the body and tail divided by longitudinal and transverse ridges, with tubercular points at the angles of intersection. Both sexes have pectoral and dorsal fins, neither have ventral nor caudal fins, and the female only has an anal fin. The length of the hippocampus, from the point of the nose to the end of the tail, is generally about five inches; the form of the body heptangular, and the number of segments into which it is divided about thirty. Its general colour is a pale ash-brown, relieved by a changeable iridescence; and variable tints of blue are dispersed over different parts of the head, body, and tail. With regard to the habits of this fish, Yarrell says,—"When swimming about, they maintain a vertical position; but the tail is ready to grasp whatever meets it in the water, quickly entwines in any direction round the weeds, and, when fixed, the animal intently watches the surrounding objects, and darts at its prey with great dexterity." It is stated that the food of the hippocampus is unknown; but it is most probable that it resembles that of other Syngnathi, and, consequently, consists of worms, small mollusca, and the ova of other fishes. —*Ref.* Yarrell's *History of British Fishes.*

HIPPOPOTAMUS, or RIVER-HORSE, *hip-po-pot'-ă-mus,* (derived from the Gr. *hippos,* the horse; *potamos,* a river,) a pachydermatous animal, which inhabits most of the rivers of Africa. Its generic characters are: four toes on all the feet, enclosed in small hoofs; six molar teeth on each side of both jaws; large and strong canines, of which the upper ones are nearly straight, the lower ones curved, and working upon each other so as to produce a chisel edge; four incisors in each jaw, the upper ones short and conical and bent inwards towards the mouth, the under ones long and cylindrical, and pointing outwards. The skeleton of the hippopotamus approaches that of the ox and of the hog; but it presents also wide differences, which separate it from classification with any other animal. From the structure of the teeth, it is evident that the quantity of vegetable matter supplied to the digestive organs must be very great in proportion to the nourishment derived from the same, as the principle on which its jaws are formed seems more for the purpose of tearing and rudely dividing than thoroughly masticating the tough grasses and vegetables which form the staple food of the animal. The hippopotami live during the daytime immersed in the waters of their native rivers, and at night come to land for the purpose of feeding, when they do an enormous amount of damage to the neighbouring fields, not only from the large amount of produce that they consume, but also the still greater quantity which they tread under foot and lay waste with their ponderous, bulky proportions. From their peculiarly aquatic habits, they appear to be possessed of some muscular arrangements for closing the nostrils, as is seen in seals and other marine animals. Remains of different species of hippopotami are often found in the tertiary geological formations of Europe; and in the tertiary stratas at the foot of the Himalaya mountains, in Hindostan, an extinct species of hippopotamus has been discovered, which had six incisor teeth in each jaw. Bochart identifies the hippopotamus with the Behemoth mentioned in Scripture; but Cuvier, while agreeing with him that the identity is possible, still asserts that the description given in the book of Job is not sufficient to place the matter beyond doubt. That it was known to the ancients is conclusive from the fact that Herodotus, Aristotle, Pliny, and Diodorus, each and all give descriptions of the animal. The specimens of the hippopotami in the gardens belonging to the Royal Zoological Society in Regent's Park consume daily upwards of one hundred lbs. weight of hay, chaff, corn, roots, and other green food.

HIPPOGLOSSUS. (*See* HOLIBUT.)

HIRCUS. (*See* GOAT.)

HIRUDO. (*See* LEECH.)

HIRUNDO, *hir-un'-do,* (Lat. a swallow,) a genus which forms the type of the fissirostral or wide-gaping birds, belonging to the Passerine tribe of the Cuvierian system. (*See* SWALLOW.)

HISTERIDÆ, *his-ter'-rĭd-dee,* a family of clavicorn beetles, in which the body is square and shining, the elytra short, the legs toothed, and the antennæ short, elbowed, and having the club three-jointed.

HOATZIN, *ho-at'-zin,* a singular bird, sometimes called the crested Touraco, allied to the Colies and Plantain-eaters. It inhabits Guiana and Brazil, and is gregarious. The plumage is brown, streaked with white, and the head has a movable crest, much like that of the cockatoo. It is as large as a peacock, and looks like a gallinaceous bird, but the flesh is so rank that it is quite uneatable. Its scientific name is *Opisthocomus cristatus.*

HOBBY, *hob'-bi,* a small British falcon (*Hypotriorchis subbuteo*) which feeds on the small birds and larger insects, such as the chaffers and grasshoppers. It is sometimes trained to chase larks. The nest is made in trees, and the eggs are two to five in number.

HOG, or HOG FAMILY, *hog,* (Welsh *hwch,* Cornish *hoch,*) (*Suidæ,*) a family of pachydermatous animals, belonging to the order Ungulata of Mammalia; or forming, according to some arrangements, a sub-family of the Elephantidæ, under the title Suina. The Suidæ are distinguished by having the nose prolonged and cartilaginous, truncate at the tip, where it is strengthened by small button-shaped bones, by which means they are enabled to use their noses as grubbers to turn up the ground in search of food. With the exception of the genus Dicotyles, (*see* PECCARY,) they have four toes on each foot, two large principal ones shod with stout hoofs, and two lateral ones, which are much shorter, and barely touch the ground. The canine teeth are large, often projecting from the mouth, and curved in an upward direction, while the molars are tubercular. Their skin is covered with thick, strong bristles, and they have a distinct tail of moderate length. The genus Sus is the type of the family Suidæ, and contains two well-known varieties,—the wild boar (*Sus scrofa*) and the domestic sow. Although formerly very common, the wild boar no longer exists in Great Britain; it is now found principally in India, and in most parts of Europe, where it harbours in the most solitary places in retired forests. As a beast of chase, it is thought well worthy of attention by sportsmen; and in India hog-hunting, under the technical term of "pig-sticking," forms one of the most exciting of wild sports. The food of the hog, in a wild state, is generally composed of grass, roots, acorns, beech-nuts, and wild fruits. He is both extremely active and very ferocious, and when driven to bay, forms a powerful adversary to even the most intrepid of hunters. In its domestic state the hog feeds and thrives on nearly every kind of food, both vegetable and animal; and no other species of beast converts a given quantity of corn or other nutritive food into fat so soon, or can be made fat on so great a variety of food. Of this useful animal there are many varieties; but the Brindled hog approaches more nearly to the wild species than any other. The Chinese variety is very short in the head, corpulent in the body, and short in the legs: although good for roasting when about three weeks old, they only make tolerable porkers, and are not of much service in making bacon, as their size is but small. The Neapolitan hog is black and very plump, with erect ears and without any hair, and forms a very good cross with the Berkshire hog. The hog is very prolific, the sow often having ten or twelve pigs at a litter, and two litters in the year. Its flesh, under the name of *pork*, constitutes a material part of the food of mankind, especially in Europe and America, although Linnæus recommends that it should only be eaten by those of a strong athletic temperament, who take a good deal of exercise. The Jews and Mohammedans abstain from the flesh of the swine, and even consider themselves defiled by touching it. To a naval and commercial nation, like Great Britain, pork is of great importance, as it takes salt better than any other flesh, and is consequently able to be longer preserved. The fat is called *lard*, and is used both for culinary and medicinal purposes. The best English hogs are those from Hants and Berks. The skin, when dried, is used for making the seats of saddles, and other purposes. The bristles are used by brushmakers, shoemakers, and other artificers; and a great quantity is imported of the same from Russia; those from Ukraine being held in the highest estimation. The Abyssinian hog (*Babirussa Alfurus*) is an inhabitant of the islands of the Indian Archipelago; it differs from the common hog, or *sus*, in consequence of the upper canine teeth being enormously developed, ascending upwards and curving back, while those of the lower jaw project straight outwards, and form long slender hooks.—(*See* BABYROUSSA.) The Ethiopian hog (*Phacochœrus æthiopicus*) is another variety; its only great distinction is the possession of a pair of lobes under the eyes, which give it a peculiar appearance; and, although much more muscular, in other respects it generally resembles the common type of the Suidæ. It inhabits Central Africa, and its flesh is esteemed a great dainty. Another species, the HALLUF, or HARUJA, belongs to the same genus, and is found in Abyssinia. Fossil remains of most of the members of the hog family have been found in tertiary formations, three alone of the species being found in the Epplesheim Sands, while their bones have been discovered in nearly every country.

HOLIBUT, *hol'-i-but*, a large flat fish, (*Hippoglossus vulgaris*,) common on the coasts of Northern Europe. It is sometimes five or six feet in length, but not so wide in proportion as the turbot. The flesh is good, but rather flavourless.

HOLOPTYCHIUS, *ho-lop-ti'-ke-us*, (Gr. *holos*, entire; *ptuche*, wrinkle—literally "all-wrinkle,") in Geol. a genus of sauroid fishes, belonging to the Devonian and Carboniferous periods. Their enamelled scales have corrugated or wrinkled surfaces, and this character suggested the generic name. The Holoptychii, judging

from their fragmentary remains, must have been of great size—from eight to ten, or even twelve feet in length. They were armed with numerous sharp-pointed fish-teeth, and also with larger reptilian teeth of conical form, placed at intervals in either jaw, evidently for the purpose of seizing and cutting up their bulkier prey.

HOMOPTERA, *hŏm-op'-tĕr-a*, an order of insects, in which the wings are four and membranous, the two front pairs being the longest, but not overlapping. The body is convex The Cicadæ, Aphidæ, and Hoppers belong to this order.

HONEY-BEAR. (*See* KINKAJOU.)

HONEY-EATERS, a large group of birds called Meliphagidæ, comprising a vast number of species, which belong mostly to Australia, New Guinea, and New Zealand. They are known by their slender and curved beaks, and the tuft of fibres at the end of the tongue.

HONEY-GUIDES, birds belonging to the genus Indicator, and allied to the cuckoos. They derive their name from their habit of chirping loudly when they find the nests of wild bees, and thus attracting human beings to the combs. Travellers soon learn to understand the cry, and always leave some honey for the bird which indicated it.

HOODED SNAKE, *hood'-ed*, in Nat. Hist. the Cobra di capello, (Port., snake with the hood.) This term is sometimes applied to the *Naja tripudians* alone, and sometimes to all the species of the genus Naja, which are very venomous serpents of the Viperidæ. They are all remarkable for the singular manner in which they dilate the back and sides of the neck when irritated or excited. To this faculty they are indebted for their name; since the elevated skin of the back of the neck, when viewed in front, presents much the appearance of a hood. Its length is generally three or four feet, of a pale dingy brown colour above, and bluish or yellowish-white below. It is characterised by a peculiar mark on the back of the neck, which closely resembles a pair of spectacles; for this reason the reptile is frequently called the "spectacle snake." It lives upon lizards and other small animals, and is easily killed, being a sluggish animal. Its bite is extremely venomous, causing death within two hours. The hooded snake is often found in the neighbourhood of human dwellings in the East Indies, and is sometimes found in the houses themselves. It appears to be attracted by the young poultry and the moisture of the drainage and wells. The poison of the hooded snake is secreted in a large gland in the head; and when the animal closes its mouth on any object, the poison flows into the wound made through a cavity in the tooth; it is, however, little disposed to use its fangs, except for the purpose of supplying itself with food. The Indian jugglers tame some of these serpents, and teach them to play tricks and dance, to astonish the people,—after having taken care, however, to pull out their poisonous teeth. The same use is made of another species in Egypt.

HOONUMAN or HUNUMAN, *hoo'-noo-man*, a monkey, (*Presbytes Entellus*,) which is very plentiful in India. It is about six feet in total length, but the tail is fully three feet long. The colour slightly varies by age, but when the animal is in its prime, it is yellowish gray, with a darker line along the back. The face and paws are black. It is held in great respect in India, being one of the many sacred animals, to insult one of which is a sin, and to kill it an inexpiable crime. Knowing from long custom their inviolability, the hoonumans crowd to human habitations, preferring the varied diet which is afforded to them by mankind, to the simpler food which they would find in the forest. They sit on the roofs of the houses, watching their opportunity to descend and make a raid among fruit, cakes, or sweetmeats, which are sold in the streets, and are quite as fearless, and nearly as troublesome, as the Brahmin bulls. Forbidden to make active resistance, the shopkeepers are too tenacious of their property to allow such thefts to be committed with entire impunity, and therefore have recourse to passive measures, by covering their roofs with thorn-branches. The monkeys soon find that to pick their way among the prickly boughs is a very troublesome operation, and that to find a comfortable seat is impossible. The temples, however, are the chief haunts of the hoonuman, because the priests supply them plentifully with food, and allow them to take any liberties with them. In the cultivated districts it is extremely injurious to the natives, flocking into their enclosures, and stealing their crops, whether grain, melons, or other vegetables.

Hoopoe, *hoop'-o*, (*Upupa epops*,) an insessoral bird, belonging to the family of the Certhiadæ. Its generic characters are; beak longer than the head, slightly bent, slender, triangular, and greater in length than in breadth; nostrils basal, lateral, oval, and partly concealed by the feathers on the forehead; wings of moderate size, the fourth and fifth quill-feathers being the longest; tail of ten feathers, square at the end; toes three in front, one behind, the outer and middle ones being united as far as the first joint; claws short, and only slightly curved. The hoopoe is a summer visitor to the British islands, and comes from the north of Africa; it is also a native of Asia. This bird is generally about a foot in length, and its plumage is composed principally of black and white feathers; it is particularly distinguished by a crest on the top of its head, composed of buff feathers, tipped with black.—*Ref.* Yarrell's *British Birds*

Horn, **Horn Manufacture**, *horn*, (Sax.)—The term *horn* is, in general language, applied to a hard substance growing on the heads of certain animals, and particularly on cloven-footed quadrupeds, usually attaining some length and ending in a point. They serve as weapons of offence and defence to the animals which bear them. In England, the substance called horn may be divided into two distinct classes:—First, the branched, bony horns of the stag genus, and the simple, laminated horns of the ox genus and other kindred genera. The first of these kinds of horn is applied to the same purposes as bone and ivory, and the manufacture is almost similar. The other kind of horn, found in the ox, antelope, goat, and sheep, consists of a number of conical sheaths inserted one into another, the innermost resting upon the vascular membrane covering the bony core. The tip is very dense, and the layers of which it is composed are scarcely distinguishable. This kind of horn appears to consist of coagulated albumen; and there is a regular connexion between horns, nails, claws, hoofs, scales, hair, feathers, and even skin and teeth. The horns of oxen are the principal ones used for manufacturing purposes; the horns of bulls and cows being preferred to those of bullocks, which are thin and of a coarse texture. The horns of goats and sheep are whiter and more transparent than those of any other animals.

Hornbill, *horn'-bill*, (*Buceros*, from Gr. *bous*, an ox, and *keras*, a horn,) a genus of birds belonging to the conirostral tribe of the order Passeres. These birds are characterised by having their large hooked beak surmounted at the base by a horny appendage nearly as big as the beak itself, and of a cellular structure within. They live on animals and vegetables, and inhabit the warmest parts of Asia and Africa. On account of their perching on the branches of lofty trees, where their vision can command an extensive range, they are extremely difficult of approach. Like the toucans, they swallow their food whole, throwing it first up in the air and catching it as it falls. The Rhinoceros hornbill (*Buceros rhinoceros*) is about the size of a turkey, and of a bluish-black colour. The horny appendage at the base of the bill of this variety is very large, and in the form of a reverted horn. It is a native of Java, and hops about on both legs like a raven, feeding chiefly on rats and mice. The African species (*Buceros africanus*) is considered a sacred bird by the negroes, who never destroy it on any account, from a superstitious belief that the death of a hornbill produces sickness over a whole district. The Pied hornbill (*Buceros monoceros*) is about the size of a raven, and nearly as black. Its crest is thin, and frequently much injured by striking against the branches of trees, the bark of which the bird tries to detach, in order to get at the insects lying beneath. From its fondness for the same insects, this species is carefully reared in Ceylon, in order to keep the houses clear of vermin. The Pied hornbill is a native of India, and lives in withered trees, in the holes of which it deposits its eggs. The Undulated hornbill (*Buceros undulatus*) is the last variety, and the most beautiful specimen of the whole genus, as the bill is more proportionate to the size of the bird, and its plumage is distinguished by more than the usual vivid colours, which add to the magnificent appearance of oriental birds.—*Ref.* Baird's *Encyclopædia of the Natural Sciences.*

Hornet, *hor'-net*, (Sax. *hyrnete*,) (*Vespa crabro*,) an aculeated hymenopterous insect, belonging to the Vespidæ, or Wasp family. The principal characteristic of the insect is taken from the structure of its wings; these, when it is at rest, are folded throughout their entire length. The fore wings have one marginal and three sub-marginal cells; and in all species the neuration is the same. The hornet is a much larger insect than the wasp, and is consequently much more formidable. It builds its nest in holes in the trunks of trees, or in old walls. Its colour is throughout of a dark brown mixed with yellow, and the head is oblong. It is very voracious and pugnacious, while the common wasp seems to be its favourite prey, although it eats almost any kind of flesh, as well as fruit and honey. The nest is smaller than that of the common wasp, and is of a globular form, constructed with the mouths of the cells downwards. Hornets are the most active little insects; they fly rapidly, and have been observed to carry on the building of their nests by moonlight, unlike the habit of most insects. Their sting is very severe, and is often productive of serious consequences. (*See* also VESPIDÆ.)

HORSE, *horse*, (Ang.-Sax.,) (Lat. *equus*,) an animal belonging to the family Equidæ, a branch of quadrupeds distinguished by a single digit and hoof on each foot. Although, however, the Equidæ possess but one developed toe, there are on each side of the metacarpus and metatarsus joints, two small rudimentary processes which represent lateral toes. The system of the dentition of the family is represented by the following formula:—

$$\text{Incisors } \frac{6}{6}, \text{ canines } \frac{1-1}{1-1}, \text{ molars } \frac{7-7}{6-6}; \text{ total } 42.$$

Of the three great divisions into which the Equidæ are separated,—namely, the horse, the ass, and the zebra, the former is the largest, the most docile, the most valuable, and, finally, more fully distributed over the surface of the globe than any of the others. That the horse existed prior to the Flood, the researches of geologists afford the most satisfactory evidence; for there is not a portion of Europe, Asia, Africa, or America, in which the fossil remains of this animal have not been discovered, mingled with the bones of the elephant, the hippopotamus, and the deer, as well as the mastodon, and other animals which have passed away from the surface of the earth. In most cases these fossils agree with the size of the horse which exists in the present day; but in South America the bones of horses of gigantic size have been exhumed. The first allusion to the horse occurs in the book of Genesis, (xxxvi. 24,) where it is said that Anah, son of Zibeon, found the mules—the progeny of the ass and the horse—in the wilderness, as he fed the asses of his father. From the remains of Grecian art and writings, we find, also, that the horse was used for chariot-races and other purposes about 1450 B.C., from which date it became more and more employed for the use of man. It is questionable whether, in the present day, there exist any real wild horses, as those which are so called have been proved, in the case of America, to have been the descendants of horses let loose by the Spaniards; and those of Asia are but the progeny of horses which have escaped from the haunts of civilisation. Both fore and hind legs of the horse have, on the inner side, an oval, horny, wrinkled plate, called a wart, sallender, or chesnut. The canine teeth are wanting in mares. The sense of touch, in general, is extremely delicate; the tongue soft; the upper lip capable of elongation and considerable mobility; and the senses of taste and hearing well developed and very acute. The eyes are large and the sight good; while the sense of smell is so particularly fine, that horses which run in a wild state are said to be able to scent their enemies at the distance of more than a league. The skin is generally covered with a coat of short hair, smooth in summer, and becoming rough and much more elongated during the winter season. The best of the wild Asiatic horses are those which inhabit Tscherkessi, Abassi, and the northern slopes of the mountains of the Caucasus. The principal varieties of these, according to Pallas, are, first, the "moustachioed" horse, characterised by numerous strong bristles on the upper lip; next, the "woolly" horse, a Russian variety, covered with a crisp woolly hair, and common amongst the Baschkirs; thirdly, a "naked" or hairless horse, which is found amongst the valleys of Krim Tartary, by the natives of which it is kept always clothed; and, lastly, a variety delineated by Johnston, in which a sort of woolly mane is continued from the neck along the back, right down to the tail, which specimen Pallas asserts that he saw amongst the Buracti. The wild horses appear to be free from nearly all those diseases and ills which prove such a burden to the domestic breed. They are generally of a pale or grayish-brown colour, with brown mane and tail, and a whitish muzzle, which subsides into a black colour about the mouth. They are less in size than the domestic horse, and have a larger head, larger ears, hoofs more contracted, and the mane more erect, whilst the tail is much shorter. They do not wander beyond the 50th degree of north latitude. They generally move about in droves, headed by a larger gray or black stallion, who constitutes himself the leader. On the Pampas of South America they are exceedingly abundant, and the Guachos, a semi-civilised race of men, live amongst them. Their mode of capturing and breaking-in these horses is very curious. The *capitar*, (or chief,) mounted on a powerful steady horse, rides into the *corral*, (a large space enclosed by an impregnable boundary of wooden stakes, into which herds of wild horses are driven by the Indians,) and, picking out the animal to be broken in, throws his lasso over his head, and drags him to the gate. For some few moments the idea in the horse is an unwillingness to lose his companions; but when once out of the gate of the corral, he endeavours to escape over the plains; but a timely check of the lasso stops him. The peons then run after him, and throw a lasso over his fore legs, and by a jerk throw him on the ground. In an instant a Guacho seats himself on his head, and cuts off the whole of his mane, whilst another cuts the hair from the end of the tail, in order to show that the animal has once been mounted. They then put a piece of hide in his mouth to serve for a bit, and a strong hide halter on his head; the Guacho who is to mount him next arranges his spurs, which are unusually long and sharp, and, whilst the two peons hold down the horse, he girths on the saddle very tightly. He then jumps into the saddle, and the other men giving the horse his head, the rider grasps the halter and prepares for action. At first the animal jumps about, sometimes with all four of his legs off the ground at once; but the spurs of the Guacho soon set him going, and off he gallops, doing everything he possibly can to unseat his rider. After galloping him about, and flogging him until every bit of spirit seems taken out of him, the Guacho rides back slowly to the corral, and the horse, so lately unruly, is quite tamed, and fit for domestic use. Immense quantities of the skin of the horse are imported annually from South America; for during the period which elapsed between 1838 to 1842, Monte Video and Buenos Ayres yielded annually about 90,000,000 lbs. of oxen and horse hides, and 9,500,000 lbs. of horsehair. The horse is naturally an herbivorous animal, as his thin muscular lips, with his compressed mouth and sharp incisor teeth, are well fitted for seizing and cropping various species of grass. In a domesticated state, however, he is obliged to eat other and harder food, as oats and corn; and for this a provision is made by nature, who supplies him with a peculiar adaptation of the bones of the face, by means of which the horse can comminute and grind down his food better than carnivorous animals. As the teeth of the horse indicate his age, as well as being distinguished for their adaptation for masticating purposes, it will be necessary to give them some slight consideration. The colt is generally dropped with the first and second molar and grinding teeth apparent. When eight days old, the two incisor teeth (central) come out, and in the next five or six weeks he has the two next incisor teeth supplied. In three months' time these teeth will all be uniform, and a third grinder appears; and, after the colt has attained his eighth month, the third nipper above and below, on each side, will appear, and the colt will be found furnished with his full complement of front teeth. These teeth are provided with an elevated cutting edge of enamel, and this edge is bent inwards and over the tooth, so as to produce a sort of cavity or depression behind it, which constitutes *the mark;* it is gradually worn down by chipping the grass, and is at length totally obliterated. By the degree in which this mark is effaced, we are enabled to judge of the age of the animal. It may also be added, that the deciduous teeth are lost in the order of their acquisition; the two middle incisors of both the upper and lower jaws being displaced between the second and third years. A three-year-old colt has the permanent middle incisors above the gum, but not on a level with the adjoining deciduous incisors; these are also characterised by a large deep groove containing a black substance crossing transversely the working edge of the corner of the tooth, and the sixth grinder is also coming into place. At four years the sixth grinder is on a level with the others, the third deciduous grinder is shed, and the mark is fainter. At six years the fissure on the middle incisors is worn away, but a discoloration still exists; at seven years the mark is worn away from the four middle incisors in both jaws; and at eight years the mark will be found gone from all the lower incisors, and ceases to afford any indication of the age of the animal. It may be added, that these marks are sooner worn away in a stall-fed horse (in consequence of its eating more oats and harder substances) than one at grass; and also that they are sometimes prematurely worn away in a "crib-biter." The mare goes with young upwards of eleven months, and foals standing. The age to which horses would reach, if untouched by disease, is not correctly known; many have exceeded thirty, and even forty, years, but the majority arrive at their end before they have attained their ninth or tenth year. The first change which domestication makes in this animal is in increasing the bulk of his trunk in comparison with his head and limbs; and, of all varieties, this change is more observed in the Arabian than any other. The head is not only proportionately smaller, but is remarkable for the breadth and squareness of the forehead, the shortness and fineness of the muzzle, prominence and brilliancy of the eyes, and the smallness of the ears. The neck of the Arabian horse is long and arched, and beautifully joined to the chest; the withers are high, and the shoulder-blade has its proper inclination backwards; while the fineness of his legs, and the oblique position of the pasterns, might be supposed, by the uninitiated, to lessen his apparent strength; but the leg, although small, is deep, and composed of bone of the densest character. Besides, the tendons are sufficiently distinct from the bone, and the starting muscles of the fore-arm and the thigh indicate that he is fully capable of accomplishing many of those feats which the wandering Bedouins and Arabs of the desert relate of their horses. The Arabian horse generally stands in height fourteen hands two inches. The Barb is another variety of the horse, and is smaller than the Arabian, which, however, it eclipses in general excellence, although it has not the Arabian's unflagging speed and spirit. The Persian horse is larger than the last-mentioned variety, and is more adapted for warlike purposes than for speed and endurance. The East Indian horse is from fourteen to fifteen hands high, and is remarkable for a want of bone below the knee, and a fulness of the hocks, which places it far below the Arabian in the scale of excellence. The Burman horse is very small, but spirited and strong: he is generally about twelve hands high. The Tartar horse is of moderate size, but full of spirit, and very bold, active, and muscular. The flesh of this horse is a frequent article of food amongst the Tartars, who also regularly employ the milk of their mares for domestic purposes. The Spanish horse used to resemble the Arabian considerably, in consequence of an admixture of the blood; but the breed has now deteriorated greatly. The Flemish horse is a large muscular animal, strongly and beautifully formed. We are indebted to it for some of the best blood of our draught horses, and we have still frequent recourse to it for keeping up and improving the breed. The various types of horses will now be given under the head of the English horse, which, in the perfection of its different varieties, eclipses those of all other countries. With regard to the *hackney*, or road horse, Mr Youatt says:—"He should be a hunter in miniature, with these exceptions: his height should rarely exceed fifteen hands and an inch; he will be more strong and more pleasant for general work below that standard; he certainly should be of a more compact form than the hunter, and have more bulk according to his height. It is of essential consequence that the bones beneath the knee should be deep and flat, and the tendon not tied in; the pastern should be short, and although oblique or slanting, far less so than that of the race-horse or hunter. The foot is a matter of the greatest consequence in a hackney: it should be of a size corresponding with the bulk of the animal, neither too hollow nor too flat, open at the heels, and free from corns and thrushes. The fore-legs should be perfectly straight; the back should be straight and short, yet sufficiently long to leave comfortable room for the saddle between the shoulders and the *huck*, without pressing on either; the road-horse should also be high in the forehead, round in the barrel, and deep in the chest." According also to Mr Youatt, the origin of the better class of *coach-horse* is the Cleveland bay, which breed is confined principally to Yorkshire and Durham. Another breed of horses is termed the "Suffolk punch," from its round punchy form, which is supposed to have originated from a cross between a Norman battle-horse and a Suffolk cart mare,—this, however, is only a supposition. According to our author, it was "the very horse to throw his whole weight in his collar, with sufficient activity to do it effectually, and hardihood to stand a long day's work." The best dray-horses, of which we see so many splendid specimens in brewers' waggons, are produced by a cross between a Suffolk punch and a Flemish mare. Our fleetest variety is the *race-horse*, the breed of which is traced back to an Arabian stallion introduced into this country by a Mr Darley; whence it was termed "the Darley Arabian." This horse was the sire of Flying Childers, and the great grandsire of Eclipse, which latter horse ran round the mile course at Newmarket in one minute. A good race-horse is "generally distinguished by his beautiful Arabian head; tapering and finely set-on neck; oblique lengthened shoulders; well-bent hinder legs; ample muscular quarters; flat legs, rather short from the knee downwards, although not always so deep as they should be; and his long and "elastic pastern." Another variety of racer springs from an animal imported into this country, and designated as the "Godolphin Arab." The *hunter*, which is our next consideration, includes the blood and high-breeding of the race-horse with the endurance of the hackney, together with a power of leaping peculiarly his own. Mr Youatt says:—"The first property of a hunter is, that he should be light in hand; for this purpose his head must be small, his neck thin, and his knees wide. The head will then be well set on; it will form a pleasant angle with the neck, which gives it a light and pleasant mouth." The Shetland and Exmoor ponies are other varieties of the English horse, which are diminutive in size, and unfit for most of the purposes to which we adapt that quadruped. The age of all horses, with the exception of that of racers, is calculated from the 1st of May, no matter in what month they are dropped; and that of racers from the 1st of January. It would be impossible, within the proportions of the present work, to enlarge on training, and other circumstances connected with the horse; the reader is referred, for further information, to Mr Youatt's excellent treatise on the horse.

HORTULIA. (*See* PYTHON, NATAL.)

HOUND, *hownd*, (Sax. *hund*,) a name applied generally to different dogs used in hunting and other field sports. The characteristic of a hound is its long pendulous ears. The bloodhound would appear to be the origin of the other sub-varieties, which are mentioned in this work under their different names. England, not only from her climate, but also on account of the great care bestowed in the breeding and management of these animals, excels all other countries in her different breeds of hounds. (*See* BLOODHOUND, FOXHOUND, GREYHOUND, HARRIER, STAGHOUND, &c. &c.)

HOWLER, URSINE, a large prehensile-tailed monkey of South America, sometimes called the Araguato, (*Mycetes ursinus.*) It has a habit of sitting on the branches and uttering loud yells, which can be heard at a very great distance, the resonance of the note being due to a great development of the hyoid bone. So large is this structure, that when the monkey opens its mouth the bone can be seen in its throat.

HUMERUS, *hu'-me-rus*, (Lat.,) a term in Surg., applied to the bone of the arm. It constitutes the first of the radiated system of bones of the anterior extremity in vertebrated animals, articulated with the scapula.

HUMMING-BIRDS, or TROCHILIDÆ, *hum'-ming*, a family belonging to the tenuirostral tribe of the order Passeres. This family contains a great number of species, above 300 having been described, and they have been divided into many genera and sub-genera, in the last ornithological catalogue, amounting to no less than seventy-six. The Trochilidæ include some of the smallest known birds, many of which are remarkable for the wonderful splendour of their plumage. In this one respect alone, neither pen nor pencil could convey any adequate idea of their dazzling lustre. They are active little birds, and from the structure of their frames, it is apparent that they were intended to pass most of their time on the wing. Their food consists of small insects, and perhaps the nectarous juices of flowers, which their tongue is beautifully fashioned for obtaining. This organ is very long, and can be darted out of the bill to a considerable length, by a sudden motion, like that of a spring. Their feet are small, generally dark-coloured, and in several species the tarsi are furnished with large plumelets, giving them the appearance of having downy muffs on their legs. These muffs, however, are not seen when the bird is alive, but are always developed by bird-stuffers. Their wings are very long and narrow, and they are, by means of the rapid motion given to them, able to balance themselves in the air, hovering round flowering shrubs and plants, probing their tubular nectaries, and at the same time emitting a pretty loud humming noise, caused by the concussion of their wings with the air, whence their English name "humming-birds." The Trochilidæ are very pugnacious little creatures, and defend their nests with the greatest courage against all intruders, even man himself. They are exclusively seen in the New World, of which they are natives, the Spaniards having first made us acquainted with them from their invasion of Mexico. They are found from one extent of the vast continent of America to another, though in greatest abundance in the tropical parts, in the deltas, and along the banks of the great rivers, both of the North and South. Humming-birds are also found in great abundance in the West India Islands, where, also, some species may be seen which do not occur on the mainland. One of these in particular, termed the *Mellisuga humilis*, has a very sweet note, and is perhaps the only species of the family that has a real song. The male bird of this variety is about two and a half inches in length, and is exactly like an humble bee when darting about in the air. The nests of the humming-birds are wonderfully made with cotton, wool, and twigs, beautifully interwoven with feathers, and lined with down; and almost all the species lay two eggs, which in some cases are extraordinarily small. The genus Trochilus, from which the family takes its distinctive characteristics, contains but comparatively few varieties. The typical species, the *Trochilus colubris*, or "ruby-throated humming-bird," is a beautiful species, about three and a half inches in length, the body glittering with green and gold, and the throat and chin glowing with a beautiful ruby colour, like that of a live coal. The smallest species of all is the *Mellisuga minima*, which is only about one inch and a quarter in length, and which weighs but twenty grains. The best work on these birds is Mr Gould's magnificent "Monograph of the Trochilidæ."

HURON. (*See* GRISON.)

HYÆNA, *hi-e'-nă*, (Lat.,) belonging to the Hyænina, a tribe of animals of the class Mammalia, order Feræ, and family Felidæ. According to naturalists, the hyænas are digitigrade animals, with more or less elongate limbs, and the body depressed posteriorly. The type of the family is the genus Hyæna, the species of which are characterised by the possession of four toes on each foot; thick, short, and blunt claws; and no small tubercular teeth in the lower jaw behind the molars. The dentition is regular; thirty-four teeth in number, eighteen in the upper, and sixteen in the lower jaw. There are five molar teeth on each side in the upper jaw, and only four on each side in the lower. The dental formula is thus expressed:—

$$\text{Incisors } \frac{6}{6}, \text{ canines} \frac{1-1}{1-1}, \text{ molars } \frac{5-5}{4-4}; \text{ total}=34$$

By the structure of their teeth, the hyænas are able to crush the bones of even the largest prey, and the muscles of their jaws and neck are so powerful, that it is almost impossible to take anything from them that they have seized. In habits, they are less sanguinary than animals of a similar nature to themselves, and live more on dead prey, even preferring flesh that has become quite putrid. In general form they resemble the Caninæ, but are easily distinguished from them by reason of the obliquity of their bodies and their peculiar walk, which gives them the appearance of having their hind legs shorter than their fore ones; not that they are really so, as this results from their always being in a state of flexion. The muzzle is obtuse, like that of a dog, and the tongue rough and furry, like that of a cat. They are nocturnal animals, and are useful in Eastern cities, where they act the part of scavengers, and carry off all refuse and decomposing bodies during the night. Of the hyæna in ancient times, many fabulous stories used to be related, which had not the slightest probable foundation. They were said to be hermaphrodites, changing their sex every year; also it was reported, that if the shadow of their bodies fell on those of dogs, it would render the latter dumb; and, finally, they were said to be able to imitate the voices of men, and to call them by name! The family of the hyænas are natives of Asia and Africa, and the common hyæna, (*vulgaris*,) or Striped hyæna, (*Hyæna striata*,) is the best known of the different species. This animal is of a yellowish-gray colour, and the skin is crossed by deep transverse black bands. From the neck along the back a long black mane, mottled with yellow hair, extends to the tail, while the ears are of a brown colour, and nearly naked, broad at the base, long and erect. Of solitary retiring habits, it is, however, easily tamed by man, and will thus become a faithful watch-dog. It is called the *strand wolf* by the inhabitants of the Cape of Good Hope, where a variety of it is found. The Spotted hyæna of the Cape, (*Crocuta maculata*,) or tiger-wolf, is smaller than the last-mentioned animal, and is of a brownish-yellow colour, diversified with numerous dark brown or black spots. The Brown hyæna (*Crocuta brunnea*) inhabits the district about Natal. The remains of hyænas have been found in most tertiary formations over the greatest part of Europe, and one variety, that of the *Hyæna spelæa*, according to Cuvier's system, has been found in nearly every part of England.

HYBRID, *hi'-brid*, (Gr. *hubris*, a mule,) a mongrel produced, whether in plants or animals, by the impregnation of the female of one species, genus, or race, by the male belonging to a different family. The commonest sorts of hybrids are those which arise from the interconnexion of different varieties of the same species; to notice which, the produce of the wild boar and domestic sow (*see* HOG) need only be mentioned. It is stated, in an article on the subject in Brande's Dictionary, that "specifical hybrids have been produced from the artifical fertilisation, by Kœlreuter, of the *Nicotiana rustica* with the pollen of *Nicotiana parriculata;* and Schiek has demonstrated, by numerous observations, that a multitude of plants produce specifical hybrids in a state of nature." Yarrell, in his "History of British Birds," states that the siskin and goldfinch are often bred with the canary, the pheasant with the common fowl, the swan with the goose, and many other birds, too numerous to mention. Among mammalia, however, although hybrids have been produced, they are not very common, although some have been obtained from the intermixture of the lion and tiger, the dog and wolf, and the horse and ass, the latter being extremely useful, and termed "the mule." Hybrids are generally sterile, and the intermixture of different species, according to Owen, is guarded against by the aversion of two specifically different individuals to sexual union.

HYDATIDS, *hi-dat'-ids*, a genus of entozoa, so called on account of the vast amount of water which is found in their cysts.

HYDROBATES. (*See* DIPPER.)

HYDROCHÆRUS. (*See* CAPYBARA.)

HYDROMYS, *hi'-drŏ-mis*, a rodent mammal, found in Van Diemen's Land, and inhabiting the banks of rivers or the shore of the sea. Its hind feet are webbed, and it is an admirable swimmer. It is sometimes called the Beaver Rat.

HYDROPHASIANUS. (*See* JACANA.)

HYLÆOSAURUS, *hi-le-o-saw'-rus*, (Gr. *hyle*, weald or forest; *sauros*, lizard,) in Geol., one of the gigantic terrestrial lizards whose remains were discovered by Dr Mantell in the Wealden strata of Tilgate Forest. The restoration of this old-world monster by Mr Waterhouse Hawkins occupies a prominent position among the palæontological illustrations in the grounds of the Crystal Palace. Dr Mantell inferred, from the size and form of the bones of the head and jaws, that the creature must have attained a length of from twenty to thirty feet. The body was broader than high, and terminated by a long flexible tail; the limbs were relatively short; the skin was covered with scales and tubercles; and a row of very large thin angular spines extended down the back, and formed a serrated dorsal crest.

Hylobates. (*See* Gibbons.)

Hymenoptera, *hi-men-op'-te-ră*, (Gr. *humen*, a membrane; *pteron*, a wing,) one of the orders into which insects are divided. They are characterised by possessing four membranous wings, of which the anterior pair are the larger, and they cross horizontally over the body when in a state of repose. Of all the orders into which insects are separated, the Hymenoptera contains the largest number remarkable for development of instinctive powers and social qualities. The females are provided with an ovipositor, consisting chiefly of three elongated slender processes, of which to serve as a sheath to the third. This ovipositor, in many species, is so organised, that with it they are not only able to perforate the substances in which they deposit their eggs, but in many cases it serves as a weapon of defence, and is the part which, in bees and wasps, is called the sting. With this weapon, which is barbed at the apex, they are able to kill their enemies, or render them torpid or powerless. The antennæ are generally filiform, or setaceous. The mesothorax and the metathorax are well developed; the protothorax is narrow. Hymenopterous insects are remarkable for the great development of the aërial tracheæ, which in many species are placed in their abdomen in pouches, and are very large in comparison with the size of the insects. They undergo what is termed incomplete metamorphosis; and in the greater number the larvæ are soft, whitish-coloured, and destitute of feet. In the imago, or perfect state, most hymenopterous insects live upon flowers, or at least often frequent them: some for the purpose of gathering honey, and others in order to find a safe retreat from whence they can attack their prey. The order Hymenoptera is divided by Latreille into two great sections: the Terebrantia, and the Aculeata. In the former, the female possesses a distinct ovipositor, and in the latter that organ is replaced by a sting. Many of the ants, however, prove an exception, since they do not possess a sting, but merely defend themselves by ejecting an acid liquid. The best-known families of the Hymenoptera are the bees, the wasps, and the ants. A description of these particular insects will be found under their respective names.

Hypotriorchis. (*See* Hobby.)

Hypsiprymnus. (*See* Kangaroo Rat.)

Hyrax, *hi'-rax*, a beautiful little animal inhabiting Southern Africa, and sometimes called the Klipdas, or Rock Rabbit. It is about as large as an ordinary rabbit, is covered with thick fur, and is extremely active, leaping about the rocks with great agility. It was long thought to be a Rodent, but is now ascertained as belonging to the Pachyderms, and to be closely allied to the hippopotamus and rhinoceros. An allied species (*Hyrax Syriacus*) is the animal which is called the "coney" in the Old Testament. Another species, the Ashkoko, is found in Northern Africa.

Hystrix. (*See* Porcupine.)

I.

Ibex, *i'-beks*, (Lat. *Capra Ibex*,) an animal belonging to the family of the Capridæ, of which it was thought by Cuvier to be the distinguishing type and parent stock. Its characteristics are similar to others of the Capridæ, and will be found given under the article Goat. The ibex is sometimes termed the *steinbok*, and is found principally inhabiting the Alps, the Carpathian mountains, and the Pyrenees, in Europe, of which continent it is a native. Its horns are extremely long, and are very large. Their colour is a deep brown, and they are marked on the upper surface with protuberant transverse rings or half-circles. The nature of the ibex is gregarious, and, consequently, it is always met with in small flocks; and the animal is likewise remarkably swift, and able to climb the highest mountains and most precipitous ascents. When pursued, it is uncommonly fierce, and will turn on its hunters with the greatest courage, and endeavour to hurl them down the precipices which it affects. It is said, also, to have the faculty of throwing itself down from the most fearful heights and alighting in safety on the ground, as it receives the shock of descent on its horns, which, by their elasticity, preserve it from any injury; the pursuit of the ibex is, therefore, extremely difficult and hazardous.

Ibigau, *ib'-ĭ-gau*, a very large goatsucker inhabiting South America, (*Nyctibus grandis*,) sometimes called the Grand Goatsucker. It is nearly as strong on the wing as the swift, needing no rest throughout the night. Its length is thirteen inches.

Ibis, *ī'-bis*, a genus of grallatory birds, common throughout Africa, one of whose most remarkable species is the *Ibis religiosa* of Cuvier. This latter variety arrives in Egypt about the time that the inundations of the Nile commence, and it emigrates from thence into Ethiopia about June, when the waters have subsided. It is about the size of a fowl, the head and neck being bare, and the body white, while the long quills of the wings are tipped with shining ashy black. It was worshipped by the ancient Egyptians, who considered it a sacred bird, and mummies of it are being continually discovered in large numbers in the catacombs of Memphis. The principal other variety is the glossy ibis, (*Ibis falcinellus*,) which is nearly two feet in length, and proportionate in size. The natural characteristics of the ibis are as follows:—Beak arched, long, slender, thick at the base, where it is quadrangular, and furnished with an obtuse tip; nostrils extending from root to tip of the beak, and linear, dividing it into three portions; head and throat bare; legs long and four-toed, the front webbed at their base as far as the first joint; the hind toe very long, and all provided with claws. Another beautiful species is the Straw-necked Ibis of Australia, (*Geronticus spinicollis*.) It derives its name from the straw-coloured feathers that hang from its neck.

Ibycter, *i-bik'-ter*, a genus of South American pelicans, having the bill compressed and the sides of the head and throat naked.

Ichneumon, *ik-nu'-mon*, (Gr. *ichneumon*, from *ichneuo*, I track; probably because it tracks the footsteps of the crocodile,) a name applied in Zool. to a genus of quadrupeds and a family of hymenopterous insects. The name of *Herpestes* is now usually given to the mammalia. The genus has the following characters:—Feet short, with five demi-palmated toes, armed with claws, which are slightly retractile; tongue furnished with horny papillæ; ears small; a voluminous simple pouch, which does not contain odoriferous matter, and at the bottom of which the vent is pierced. Body very much elongated, with a long tail, strong at its base. The species of the genus Herpestes are found in Asia and Africa. The *Herpestes Ichneumon*, or *Ichneumon Pharaonis*, has fur of a chestnut-brown and yellow colour, each hair being annulated with those two colours; the feet and muzzle are black, or deep chestnut, and the tail is terminated by a tuft of long hair. It appears to have been one of the sacred animals of the ancient Egyptians; and according to Herodotus, it was buried in "holy repositories." Although many fabulous feats performed by this animal, in destroying crocodiles, are narrated by ancient writers, they would all appear to be founded upon its industrious searching for the eggs of that reptile, which tends materially to check its reproduction. The ichneumon, however, preys upon the eggs of other animals besides those of crocodiles. In Upper and Lower Egypt, during the inundations of the Nile, it is frequently found in gardens and near the villages; but in the dry season it resorts to the open fields and to the banks of the river. It feeds on plants, eggs, and fowls, killing the latter in the villages at night. In Upper Egypt, it searches for the eggs of the crocodile, which lie hid in the sand on the shore, and eats them. The ichneumon can be easily tamed, and taught to go about a house like a cat. It makes a growling noise, and barks when angry. A gray ichneumon (*Herpestes griseus*) has been known to kill twelve full-grown rats, which were let loose in a room sixteen feet square, in less than a minute and a half. It also destroys small reptiles. One of the prettiest species is the Garangary of Java, it is of a light ruddy chestnut above, and pale fawn below. Its scientific name is *Herpestes Javanicus*.

Ichneumon Flies.—The genus of insects called ichneumons belong to the order Hymenoptera, section Terebrantia, and family Pupivora, in the arrangement of Latreille. They are remarkable for the habits of their larvæ, which are parasitic in the bodies of other insects. The perfect ichneumons perforate these bodies by means of their ovipositors, and there deposit their eggs. They have derived their name from this destructive habit, a comparison having been drawn between them and the *Herpestes Ichneumon*, the quadruped above described. The development of these parasitic insects within the body of other insects afforded much speculation among early philosophers, who fancied that occasionally one animal had the power of being transformed into another. The eggs of the genus Ophion are of a singular form, being bean-shaped, and attached near one end by a long slender peduncle to the body of the victim. When hatched, the larva retains its position, and lives upon the juices of the insect it attacks.

Ichnites, *ik'-nites*, (Gr. *ichnos*, a footprint,) in Geol., a term applied to all fossil footprints.

Ichthyodorulite, *ik-the-o-dor'-u-lite*, (Gr. *ichthus*, fish; *doru*, spear; *lithos*, stone,) in Geol., a fossil fin-spine. The spines of certain shark-like fishes of the lower coal-measures are often more than a foot long, and exceedingly strong.

Ichthyolite, *ik'-the-o-lite*, (Gr. *ichthus*, fish; *lithos*, stone,) in Geol., a general term for a fossil fish, or any portion of a fish; as a scale, tooth, or spine.

Ichthyology, *ik-the-ol'-o-je*, (Gr. *ichthus*, a fish; *logos*, a discourse,) that branch of science which treats of the natural history of fishes. For a general description of the features and anatomy of these many-formed animals, the reader is referred to a former article. (*See* Fish.) The science of ichthyology, during many remote ages, consisted, in common with all similar branches of human knowledge, of merely a few partial, unconnected observations. Aristotle, about 350 years before the Christian era, made some progress towards connecting these together as a body of doctrine; but no real advance was made till the middle of the sixteenth century, when Belon, Rondelet, and Salviani, the true founders of modern ichthyology, made their appearance. These men, instead of merely compiling, like their predecessors, saw and examined for themselves, and made drawings from nature. About the end of the seventeenth century, Willughby, and the celebrated John Ray, first issued a history of fishes, in which the species were not only accurately described from nature, but distributed in accordance with characters drawn solely from their structure. Finally, Artedi and Linnæus, about the middle of the eighteenth century, completed the work which the others had commenced, by establishing well-defined generic groups, consisting of species well ascertained and accurately characterised. The greatest stride that the science has made since that time is due to the zeal, accuracy, and perseverance of Baron Cuvier, whose great work, "Histoire Naturelle des Poissons," treats comprehensively of the subject. In none of the greater divisions of the animal kingdom were Cuvier's labours in forming a natural arrangement of the species of more value than in the class of fishes, the lowest of the Vertebrata, or those animals which possess a central bony axis, on which the soft parts are sustained, and from which the motive powers diverge. In the lowest known form of fish, the lancelet, the whole vertebral column is merely a pulpy nervous chord, invested by a membranous sheath. The vascular trunks and digestive organs in all the Vertebrata are protected by the inferior processes and diverging appendages of the vertebra; and the type of this division of animals is essentially quadrupedal, though in several groups, one or both pairs of limbs are either rudimental or altogether absent. Deviations from the ordinary type of this nature are principally to be found among the classes of fishes and reptiles. In fishes, these limbs are called fins, the anterior being named the pectoral fins, and the posterior the dorsal fins. The vertical fins are of a different nature. Artedi denominated those fishes which have spinous rays on the back, Acanthopterygians, (Gr. *acantha*, a thorn; *pterux*, a wing,) and those which have only flexible and jointed rays, Malacopterygians, (Gr. *malakos*, soft; *pterux*, a wing.) According to Cuvier, the acanthopterygian character assumes a preponderance over all other divisions, and renders them secondary, and incapable of being placed in opposition to it. The Malacopterygian families are distinguished by more marked differences and characters than the former; some are both naturally and distinctly limited, so that each is not only clearly separated from the other, but also retains within itself a great resemblance to the details. The history of fishes commences with the Acanthopterygians, which constitute one immense family. Amongst them are many varieties, useful as articles of food, and of considerable value to man in a commercial point of view. The Malacopterygians include the abdominal fishes, which have the ventral fins situated behind the pectoral. These are mostly fresh-water fishes, such as the carp, pike, and salmon: the herrings are also of the same nature. The sub-brachial and apodal fishes have cartilaginous fins. One of the best modern classifications of fishes is that of Professor Müller, who finds characters which he considers to be of the highest importance in the vascular system. There is in most fishes, close to the ventricle, a thick muscular swelling of the commencement of the arterial system, which might almost be called a third chamber of the heart. The blood is prevented from regurgitating into the ventricle, on the contraction of this bulb, by valves. The number of these openings, and the presence or absence of the thick muscular coating of the bulb, furnish distinct characters for the different groups. Müller says that these characters are so constant, that he is unacquainted with any others, either anatomical or zoological, equal to them in certainty. The Plagiostomi, or cartilaginous fishes, have three or more rows of valves within the muscular valve. In the Ganoids, a still greater number is present; but in the large group formed by the osseous fishes, after the ganoids have been removed from them, there are only *two opposite valves* at the origin of the bulb. This large group of perfect osseous fishes Müller names Teleostei. Altogether he makes six sub-classes of fish: Teleostei, Dipnoi, Ganoidei, Elasmobranchii, Marsipobranchii, or Cyclostomi, and Leptocardii. In Professor Owen's modification of this arrangement, these sub-classes are not preserved, the class being subdivided into eleven orders, and again into sub-orders. The first order, Dermopterous fishes, (Gr. *derma*, skin; *pteron*, a wing,) possess cutaneous vertical fins, in which the mucoid rays are soft and delicate, or altogether imperceptible. The species are not numerous, and are of a vermiform shape. They are divided into the following sub-orders:—1. Pharyngobranchs. 2. Suckers, to which several species belong, one of which the New Zealanders roast and eat; the lamprey belongs to the same sub-order. 3. Ribbon Apodals, delicate, semi-transparent, and scaleless fishes, which are inhabitants of all the oceans. The second order, Malacopterous fishes, have a well-ossified skeleton, and a head that is at once recognised as such, but with the bones of the face less developed than in more highly organised fishes. They are divided into the following sub-orders:—1. Serpentiform Apodals, which include the Anguillidæ. The eel (*Anguilla vulgaris*) grows in this country to the size of two or three feet, and is sometimes said to reach five or six feet in length. 2. Apodals, with articulated fin-rays. The best-known species of this sub-order is the *Gymnotus electricus*, or electric eel. It is remarkable for the violence of its electric shocks, which are often powerful enough to stupefy a man or horse. 3. Malacopterous Abdominal fishes. The species of this family are so numerous, and so much alike, that considerable confusion prevailed concerning those described by early writers. The best-known fishes of this tribe are the herring, pilchard, anchovy, salmon, trout, grayling, pike, carp, tench, bream, and chubb. The large family of the Siluroids complete the race of Malacopterous fishes. They have an air-tube to their swim-bladder, and some of the rays of their fins are firmer, stouter, and nearly as hard as those of Acanthopterous fishes. The third order consists of the Pharyngognaths. In all these fishes, the lower pharyngeals are united to form one bone. They are divided into two sub-orders: the Malacopterygii, and the Acanthopterygii; amongst the former, the flying-fish is best known. The fourth order is that of the Anacanths. The only difference that exists between this order and that of the Acanthopterous fishes is the absence of spinous or pungent rays in the fins. It is divided into two sub-orders: 1. Ophididæ, containing the cod, haddock, dorse, whiting, and common hake. 2. Thoracici, which numbers the Echeneis and the Flounder family. The Acanthopterous fishes form the fifth and most extensive of all the orders, and consist of twenty-four families. The sixth order is composed of Plectognathous fishes, (Gr. *plektos*, interlaced; *gnathos*, jaw.) The bones of the Plectognaths differ in some degree from those of the great mass of osseous fishes, and there are fewer pieces in their skeletons. The upper jaw is immovable, and the dermal productions, scales, spines, roughness, and osseous plates, differ from ordinary fish-scales. The order consists of three families. Fishes of the seventh order, Lophobranchs, (Gr. *lophos*, a tuft; *branchia*, gills,) possess an osseous skeleton, and complete and free jaws; but the ultimate division of their branchiæ, instead of being pectinated, is divided into small tufts, which are ranged by pairs along the branchial arches. They are thus, as it were, encased in mail armour; and this, together with their angular form, gives them a singular aspect. The order contains three families, among the most interesting members of which are the sea-horse fish, and the pipe-fish. The eighth order is that of the Ganoids. The scales of the ganoids are generally of a rhombic or quadrangular form, seldom rounded in outline, and always coated on the surface with a layer of enamel. The living ganoids have all bony skeletons, but in many of the fossil ones the skeletons have been cartilaginous, like that of the sturgeon. There are three families belonging to the order. The Sirenoids form the ninth order, of which two distinct species are known: one found in the river Amazon, and another, called the *Lepidosiren annectans*, which inhabits the river Gambia. Very little is known about the former, but the latter has been frequently examined, and has given rise to much discussion among naturalists as to whether it ought to be classed with reptiles or fishes. After the floods, at the conclusion of the rainy season, have begun to retire, this fish is left behind in the mud, which the tropical sun soon converts into a hard cake. An aperture, however, is left to admit air, and the Lepidosiren remains torpid in its chamber till the water again overflows the country. The tenth order consists of the Chondropterygians, or cartilaginous fishes, which contains the false shark. The Plagiostomic fishes, (Gr. *plagios*, sideways; *tomos*, a cut,) or Sharks, form the eleventh order, and are divided into two sub-orders: the Squali and the Raiæ. The Squali, or sharks, are of several varieties: the Scyllidæ, or dog-fishes; the Carcharidæ, which are armed with teeth arranged in a linear series, so as to form a sharp saw, each tooth, in the majority of species, being also serrated on the edge. They have been known to divide the body of a man in two at one bite. Of the Galeidæ, or *Topes* and *Hounds*, there are two British examples, called by the fishermen, of different localities, "penny-dog," and "miller's dog." The Lamnidæ furnish the *Lamna cornubica*, the most formidable of the sharks met with in the English Channel. The *Alopecias vulpes* is distinguished from the rest of this sub-order by the great length of the upper lobe of its tail exceeding that of its body. It is often called the "thrasher" by seamen, on account of its attacking the whale, and striking it violent blows with its tail. Another family of sharks is the Cestracions, of which two species have been observed: one near Japan, and the other in the Australian seas. The Raiæ, or sub-order of Rays, is familiarly known by the name of Skates. The general character of its form is the extreme depression of its body, and the lateral expansion of the dorsal fins; the torpedo belongs to this sub-order. The study of the geographical distribution of species is very important in its connexion with ichthyology. It is especially of importance to a maritime nation like our own, anxious to extend her fisheries, thereby not only increasing the supply of nourishing food, but also fostering and encouraging her school for seamen.—Ref. *Biographia Zoologia*, published by the Ray Society; and the article on Ichthyology, by the late James Wilson and Sir John Richardson, in the *Encyclopædia Britannica*.

ICHTHYOSAURUS, (Gr. *ichthus*, fish; *sauros*, lizard,) in Geol., a well-known genus of extinct marine saurians, so called from the combination of fish and lizard characters. The great era of ichthyosaur development was from the middle Trias to the Chalk inclusive, the Lias formation being the chief repository of their remains in England. In this deposit, specimens of all ages and of all sizes have been found, from the fœtus of a few inches to the adult more than thirty feet in length. The following are the most striking peculiarities in the structure of the fish-lizard:—The vertebræ resemble those of fishes in being concave at each end. The cranium resembles that of the crocodile, but is characterised by a remarkably large eye-orbit, furnished with a circular series of bony sclerotic plates, a structure observable in the eyes of turtles, lizards, and many birds. The teeth, which are extremely numerous, resemble in structure those of the crocodiles, but are implanted in a deep continuous groove, and not in distinct sockets. The locomotive extremities are similar to the paddles of the whale; but they are four, instead of two, in number. From the form and position of masses of crushed and apparently half-digested fish-bones and scales in the abdominal cavity, it is concluded that the ichthyosaurs preyed upon fish; and from the shape of their coprolites, or fossil excrements, it is obvious that their intestinal canals were furnished with spiral valves, as in the sharks. In one or two instances, very small, and to all appearance fœtal specimens, have been found within the pelvic cavities of large ichthyosaurs; and from this circumstance it has been inferred that these extraordinary creatures, like the whales, were viviparous.

ICTINIA, *ik-tin'-ĭ-a*, a genus of falcons found in America, having very long and narrow wings, and a short and slightly forked tail. The Mississippi kite belongs to this genus.

IERACIDEA. (*See* BERIGORA.)

IGUANA, *ig-u-ăn'-nă*, the type of the Iguanidæ, a family of Saurian reptiles, forming, along with the Agamidæ, the tribe Strobilosaura. With regard to the name of this family, Cuvier states, on the authority of Hernandes and Scaliger, that it was originally a St Domingo word, where it was pronounced by the natives *hiuana*, or *igoana*. He next affirms that it was derived, according to Bontius, from the Javanese *leguan;* if so, the word must have been transported to America by the Portuguese or Spaniards, and there applied to the reptile. However, whatever the definition, the word itself has been Latinised, and is used to distinguish the class to which it is applied. The principal characteristics of the *iguana* are as follows:—A large thin fold of skin, or dewlap, under the chin; cephalic cuticular plates, polygonal, unequal in diameter, flat, or carinated; a double row of small palatal teeth; maxillary teeth, with their edges finely denticulated; a crest on the back and tail; toes long and unequal; tail very long, slender, and compressed, and covered with small, equal, imbricated, carinated scales. It is a very nimble reptile generally, and lives in warm climates. Some of the species live upon vegetables, and others upon animal food. It particularly inhabits South America and the West Indies, where it is very numerous. From its cleanly habits and delicate flesh, it is esteemed a great dainty, and tastes very like chicken. It lives for the most part on trees; but when forced to take the water, it can swim very readily. This variety of the Iguanidæ—*i.e.*, the common iguana, or *Iguana tuberculata*—is about five feet in length, although many exceed that. It is of a more or less green colour throughout, and its dewlap is of a bright yellow colour, as is also the crest which runs along the back. They are thought to be best fit for eating in the spring, when they are sought and hunted with great avidity. Although in reality very timid animals, they have a very formidable appearance, which is utterly belied by their harmless habits, and endeavour always to escape when pursued. The female deposits her eggs in the sand, where they are hatched by the warmth of the sun.

IGUANODON, *ig-u-ăn'-o-don*, (*iguana*, and Gr. *odous*, a tooth,) an extinct genus of gigantic reptiles, discovered by Dr Mantell, and named by him on account of the resemblance of their teeth to those of the iguana. Soon after the discovery by Dr Mantell of the bones of collossal reptiles in Tilgate Forest, his curiosity was excited by some teeth of a very peculiar character, since they were totally unlike any that had previously come under his observa-

Humming Birds.

tion. The first specimen that attracted his attention was a large tooth, which, from the worn, smooth, and oblique surface of the crown, had evidently belonged to an herbivorous animal, and so entirely resembled the corresponding part of an incisor of a large pachyderm ground down by use, that he was much embarrassed at finding it in such ancient strata. As no existing reptiles are capable of masticating their food, he could not venture to assign the tooth to a saurian. For some time, the nature of the animal to which the tooth had belonged remained in doubt. Baron Cuvier, to whom the tooth was shown, pronounced it to be an upper incisor of a rhinoceros, while in the Geological Society of London it was said that the teeth were of no particular interest, and either belonged to some large fish allied to the *Anarchicas lupus*, or wolf-fish, or were mammalian teeth from some diluvial deposit. Dr Mantell and Dr Wollaston alone contended that they were the teeth of some unknown herbivorous reptile. It was not, however, till afterwards, when other bones had been discovered, and these compared with the skeleton of an iguana, that the correctness of their opinions was admitted. The size to which these reptiles attained in former ages must have been enormous. There is a portion of a femur in Dr Mantell's collection twenty-two inches in girth at the smallest part. It is therefore calculated that the thigh-bone of the iguanodon exceeded in bulk that of the largest elephant, and its length is estimated to have been from four to five feet. After comparing the bones of the iguanodon with those of the iguana, and taking an average from eight separate parts of the respective skeletons, Dr Mantell gives the following as the dimensions of this giant of the Weald:—Length from snout to extremity of tail, 70 feet; length of tail, 52½ feet; circumference of body, 14½ feet. On the snout of the iguanodon was a horn, and the general appearance of the reptile must have fully realised the wildest ideas of the dragons of poetic lore. Professor Owen does not think that the iguanodon was so large an animal as Dr Mantell infers, but believes that it was about thirty feet in length. It appears probable that the most formidable instrument of attack and defence possessed by this reptile was its long and powerful tail. During the age of Reptiles, the iguanodon seems to have occupied the same relative station in the scale of being, and fulfilled the same general purposes in nature's economy, as the mastodons, mylodons, and mammoths of the tertiary era, and the pachydermous animals of the present time.—*Ref.* Mantell's *Petrifactions and their Teachings;* Owen's *Report on British Fossil Reptiles.*

ILEUM, *il'-e-um,* (Gr. *eileo,* I turn about, from its numerous convolutions,) in Anat., is the name given to the last portion of the small intestines which terminates at the valve of the cæcum.

IMPOOFO, *im-poo'-fo,* the native name of the Eland, *q.v.*

IMPOON. (*See* DUYKER-BOK.)

INCISORS, *in-si'-zorz,* (Lat. *incisores,* from *incido,* I cut,) in Anat., is the name given to the four front teeth in each jaw, so called from their use in cutting the food.

INCUBATION. (*See* HATCHING.)

INDICATOR. (*See* HONEY-GUIDES.)

INDRI, *in'-dry,* a curious monkey of Madagascar, (*Indris laniger,*) measuring about nineteen inches in total length, and being covered with very woolly brown hair.

INFUNDIBULATA, *in-fun-di-bew-lau'-ta,* a name for the marine polygon, because the mouth of each cell is round and funnel-shaped. (*See* POLYZOA.)

INFUSORIA, *in-fu-so'-re-ă,* (Lat. *infundo,* I pour in,) a class of very minute animalcules inhabiting stagnant water, fresh or salt, in which plants are growing, or in which an abundance of decayed animal or vegetable matter is contained. The invention of the microscope revealed the existence of myriads of living creatures whose presence, up to that time, was unsuspected; and by its means we are able to perceive that a drop of water, though apparently perfectly clear to the naked eye, is really swarming with living beings. Species have been described from 1-1500th to 1-2000th of a line in length. They are, indeed, so extremely minute in size, that it is calculated that a moderately-sized drop of water may contain 500,000,000 of them. The infusoria are of very simple organisation, as they have neither vessels nor nerves, are not symmetrical, have not distinct sexes, have no visible eggs, and are without determined or apparent digestive cavities. Their chief organs seem to be internal spherical cavities, frequently containing foreign particles derived from the surrounding water, and supposed to serve as food. Some of them have no apparent locomotive organs; others have either cilia, or changeable processes, as they are called—expansions of the substance of the body. In most cases, the substance of the bodies of infusoria consists of a glutinous, homogeneous, or slightly granular, transparent mass. Red specks resembling eyes have been observed in some varieties, and by many zoologists they are so considered; while others deny it, on account of the absence of any nervous system, and no appearance of any cornea or lens. The food of infusoria consists of decomposing vegetable and animal matter, and they frequently devour each other. They are the prey of other aquatic animals, and, as soon as they accumulate in large quantities, contribute largely to the nourishment of more highly organised beings which are useful to man. This has been particularly observed in cold climates, where vegetable life ceases to exist in the ocean. Infusoria are found to exist in these latitudes in inconceivable numbers, and form the principal nourishment of the fishes inhabiting those parts. Their mode of propagation is very remarkable: it consists in spontaneous division, which is either longitudinal or transverse; in gemmation, the buds arising from the posterior part of the body; in the incysted process, cysts forming, which, when they burst, liberate animalcules which do not resemble their parent in form, and also in alternation of generations. (*See* GENERATIONS, ALTERNATION OF.) Infusoria frequently occur in such large numbers as to colour large tracts of water. Some of these impart a blood-red hue to the water, others a blue colour, while others tinge the surface with green. They can resist a temperature of 24° below freezing-point, and a degree of heat equal to 260°. Ehrenberg, whose labours have principally contributed to the knowledge of the nature and structure of the infusoria, has divided them into two large groups: Polygastrica, and Rotifera. The latter family, however, has lately been proved to be of a much higher organisation than the former, and has consequently been removed into a separate class away from the infusoria. The Polygastrica have also been shown to contain several families which are not true infusoria. Among these may be mentioned the Diatomaceæ, which have been proved to be varieties of algæ. The greater portion of the fossil infusoria described by naturalists has also been removed to the Diatomaceæ.—*Ref.* Ehrenberg's *Die Infusionsthierchen; Memoirs of the Berlin Academy*, and translations in Taylor's *Scientific Memoirs;* Mantell's *Medals of Creation and Annals of Natural History.*

INNOMINATUM, OS, *in-nom-in-ai'-tum*, (Lat. *in*, without; *nomen*, a name,) is the name given to the large irregular bone situated at the side of the pelvis. It is composed of three bones, which are distinct in the young subject, and are the *os ilium*, or haunch-bone; the *os ischium*, or hip-bone; and the *os pubis*, or sham-bone.

INSECTA, *in-sek'-tă*, (Lat. *insectus*, divided into segments,) a class of invertebrate animals belonging to the sub-kingdom Annulosa. According to Latreille's arrangement, in the "Règne Animal," the class Insecta forms the third great division of the articulated animals, referring to the articulations, or innumerable joints, of which this class of animals is composed. The following may be taken as a definition of a true insect:—An articulated animal having six legs, two antennæ, two compound eyes; a small brain at the anterior extremity of a double medullary chord; circulation effected by a pulsating dorsal vessel provided with numerous valves; respiration by tracheæ, which form two lateral trunks, and ramify through the body; generation oviparous; two distinct sexes; adult state attained through a series of metamorphoses. (*See* INSECT TRANSFORMATIONS.) In general, every insect possesses two pairs of wings; the trunk, in the adult animal, is usually composed of three chief parts: the head, thorax, and abdomen. The trunk of an insect may also be described as consisting of thirteen segments: of which one constitutes the head, three the thorax, and nine the abdomen. The principal parts of the head are the clypeus, or upper part adjoining the labrum; the vertex, or summit of the head; the occiput, or hinder portion; and the genæ, or cheeks. Oculi, the compound eyes, are almost always two in number, placed on either side of the head, and composed of hexagonal lenses. The stemmata are minute simple eyes, and may be seen in the orders Hymenoptera, Orthoptera, and Hemiptera. They are also possessed by the larvæ of coleopterous insects. The antennæ are two-jointed organs, usually springing from the upper surface or side of the head, near the eyes. These organs vary greatly, not only in different species, but often in the sexes of the same species. Much difference of opinion exists as to the use of these antennæ. By some, they are considered organs of hearing, while others aver that they are organs of touch or smell. It is probable that they are used for different purposes by different varieties of insects. The trophi, or parts of the mouth, consist of the labrum, or upper lip; the labium, or under lip; the mandibles, or jaws; and maxillæ, or feeder-jaws. The term thorax is applied to all that portion of an insect which lies between the head and the abdomen, and to which the legs and wings are attached. The three segments of the thorax mentioned before are called the protothorax, the mesothorax, and the metathorax respectively, passing from the head to the abdomen. The protothorax bears the anterior pair of legs, and is largely developed in the Coleoptera, Orthoptera, and Hemiptera; but in the Lepidoptera it merely forms a narrow ring, and in the Hymenoptera, frequently a distinct neck. The mesothorax is more complicated than the first section, since it bears a pair of legs, and the anterior pair of wings. It is well developed in all insects. The metathorax bears the posterior wings, and is well developed in those animals which have them; but in those insects which want them, as the Diptera, the metathorax is small. In the abdomen of insects, although nine segments are always visible in the larvæ, there are seldom more than seven or eight visible joints in the perfect insect. The substance of which the abdominal segments are composed is always softer and more flexible than that of the head and thorax. To the abdomen, which never possesses organs of locomotion, are attached various appendages, which differ very much in different families. The digestive system is well developed, and consists of an intestinal canal, in which a crop, gizzard, stomach, and small intestine, are generally distinct; but these parts vary according to the nature of the food, similarly to those of the higher order of animals. The circulation of the blood in insects is carried on by distinct vessels, and also by a channel in the intestines. Its central organ is the dorsal vessel. The muscular system of insects is highly developed, and their locomotive powers far surpass those of any animal whatever. Insects possess great powers of multiplication. Their eggs are very variable in shape, but their general form is oval; they are, however, often round, and sometimes cylindrical. In the ordinary language of entomology, the term "larva" is applied to the insect from the date of its escape from the egg to the time when its wings begin to appear. (For classification of insects, *see* ENTOMOLOGY.)

INSECTIVORA, *in-sek-tiv'-o-ră*, (Lat., insect-eaters,) an order of carnivorous quadrupeds, and deriving its name from the habits of the species belonging to it. Their distinguishing characteristics are the conical points on their teeth, for the purpose of crushing the hard outer coverings of the insects on which they feed. They are divided into four different families:—the Talpidæ, or moles, the Soricidæ, or shrews; the Erinacidæ, or hedgehogs; and the Tupaidæ, or banxrings, a group of animals inhabiting the East Indies, and bearing a close resemblance to squirrels in their appearance and habits. The term Insectivora is also applied to an order of birds in the ornithological system of Temminck.

INSECT-TRANSFORMATIONS, *trănz-for-mai'-shuns*, (Lat. *trans*, beyond; *forma*, a shape.)—When the larvæ of an insect leave the egg, they are often very unlike the parent, and require several changes of form before they assume the perfect shape. As the young animal increases in size, its integument becomes too small, and is thrown off, while a new one forms in its place. This moulting or change of skin takes place several times, generally as many as five, before the larvæ attain their full growth. At the period of the last change, many insects spin a cocoon of silky fibres, others dig a hole in the ground, and in these retreats await their second transformation, changing into the state of nympha or pupa while there. They continue immovable, and in a state of repose, for a certain time, varying from a few days to some weeks, months, or even, in a few, to a couple of years. Great changes take place in the organs of insects during this period. They gradually become developed, till, at the proper time for becoming mature, the perfect insects burst forth from their pupa-cases. Some insects, however, such as the dragon-flies, earwigs, &c., retain their activity throughout their pupal condition. In the course of insect-transformation, the grade of development at which the insect primarily leaves the egg is very different in the several orders and families. In all cases, the embryonic mass within the egg is first converted into a footless worm, resembling the higher Entozoa, or the inferior Annelida, in its general organisation, but possessing thirteen segments, the typical number of the class of insects. In the Diptera, Hymenoptera, and in some of the Coleoptera, the head of the larvæ, which are known as "maggots," differs little from the segments of the body, the eyes in many cases not being developed, and the mouth being furnished with a mere suctorial disk. In the Lepidoptera, and most of the Coleoptera, at the time of escape, the larvæ possesses the rudiments of three pairs of thoracic legs, although they are little else than simple claws, except in the carnivorous beetles. These larvæ are usually designated "caterpillars." The transformation of insects was observed by the ancient Greeks and Romans, and amongst them a butterfly, or perfect insect, was used as a symbol to represent the soul.

INTERCOSTAL, *in-ter-kos'-tăl*, (Lat. *inter*, between, and *costa*, a rib,) in Anat., is a term applied to certain muscles, vessels, &c., situated between the ribs. There are two sets of intercostal muscles: the external and internal, which decussate each other like the strokes of the letter X.

INTESTINAL WORMS, *in-tes'-ti-năl*, (Lat. *intestina*, an intestine,) a class of animals which infests the interior of other animal bodies, and, as its name implies, especially the intestinal tube. All animals seem destined to be preyed on by others, not only after death, but during life. The frequency of worms in the bodies of human beings, as well as of the lower animals; their situation generally in those portions of the body where they would be expelled by the efforts of nature alone: thus almost forcing them on observation, rendered them objects of interest in physiology and pathology from a very remote time. Yet, though so long and so frequently investigated, the science of Helminthology, (Gr. *helmins*, a worm; *logos*, a discourse,) or the natural history of worms, has only made great progress in the last half-century. There is scarcely any disease which has not at some time been attributed to worms. The entozoa, or intestinal worms, form a family, or class, of the sub-kingdom of Zoophytes. Rudolphi introduced the term Entozoa into the language of natural history; and the word has been adopted, not only in this country, but also in France and Germany. It includes all those animals which naturally and permanently inhabit the intestines, or any other internal part of animal bodies. These creatures do not, however, infest every animal indiscriminately; on the contrary, the parasites of nearly every species are peculiar to itself, or they are confined to a few, the habits and structure of which are analogous. The reasons which determine these parasites to select individual animals are unknown; but it would appear that worms generally infest the delicate and sickly; that in some cases youth seems to favour their production, and in others maturity. In human beings, the use of a crude farinaceous diet has been much blamed; yet the poor of Scotland, who subsist mostly on food of this sort, are not more troubled with worms than the poor of England. The generation of an entozoon, called the *fluke*, in sheep and cattle, is said to be favoured by rich moist pastures. Salt pastures, on the contrary, are said to be destructive to the fluke and worm. According to Dr Paris, "Salt, when taken in moderate quantities, promotes, while in excessive ones it prevents, digestion; it is therefore tonic and anthelmintic, correcting that disordered state of the bowels which favours the propagation of worms." Lord Somerville also adduces an instance of the results of the want of salt, a punishment formerly existing in Holland. "The ancient laws of that country ordained men to be kept on bread alone, unmixed with salt, as the severest punishment that could be inflicted upon them in their moist climate. The effect was horrible: those wretched criminals are said to have been devoured by worms engendered in their own stomachs." Although intestinal worms are found principally in the alimentary canal and the viscera subservient to its functions, they are, however, not confined to this portion of the body. Some species have their appropriated seats in the cellular, adipose, and serous tissues, and in the parenchyma of the most secret organs. One species is found in vast numbers in the voluntary muscles, and more than one has penetrated the heart. Several are developed in the brain, the lungs, and air-passages, the liver, and the kidneys; one or more have entered the blood-vessels, or tumours connected with them; others are to be found in the humours of the eye, and several species in the urinary secretions. The variety of external form in all intestinal worms is sufficiently great to form the basis of their classification into five subordinate divisions:— 1. Nematoidea, (Gr. *nema*, a filament; *eidos*, a form,) round worms. The body of these worms is cylindrical and elastic, with the intestinal tube terminated at one end by the mouth, at the other by an anus; the sexes are separate. 2. Acanthocephala, (Gr. *acanthos*, a thorn; *cephale*, a head,) hooked worms. Their characteristics are—a roundish body, utricular and elastic; proboscis retractile, armed with spinules arranged in rows; sexes distinct. 3. Trematoda, (Gr. *trema*, a hole,) fluke-worms. Their characteristics are—a flattish soft body, of various forms, often tending to oval; one or more pores on its under surface. They have no intestinal canal, and the organs of generation of the two sexes co-exist in the same individual. 4. Cestoidea, (Gr. *kestos*, a band; *eidos*, a form,) tape-worms. These parasites have a soft elongated body, flat like a ribbon, in some continuous, in others articulated; the head is either only simply labiated, or provided with pits, or with two or four suctorious orifices. There is no trace of an intestinal canal, and the male and female organs are present in each individual. 5. Cystica, (*kustis*, a bladder,) hydatids, (*which see.*) The characteristics of these worms are—a flattish or rounded body, terminating posteriorly in a transparent bladder-like cyst, filled with a pellucid fluid, which is sometimes common to many individuals; head provided with two or four pits, or with four suckers, and with a circle of hooklets, or with four unarmed or uncinated tentacles. The sexual organs have been hitherto undiscernible.

INTESTINES, *in-tes'-tins*, (from Lat. *intus*, within,) in Anat., is that part of the alimentary canal which extends from the stomach to the anus, and is situated in the cavity of the abdomen; the entire length of the intestinal canal is about six times that of the body. It is composed of three coats, or membranes: the peritoneal, the muscular, and the villous. It is divided into the small and large intestines. The small intestines have three divisions: the duodenum, so called from its length being about twelve finger-breadths, and which commences at the pyloric end of the stomach; the jejunum, so named from being generally found empty; and the ileum. The large intestines have likewise three divisions: the cæcum, colon, and rectum. Each of the parts will be found described separately under their own names. The small intestines have internal membranous folds called *valvulæ conniventes;* while the large intestines have three strong muscular bands, which run parallel upon the surface.

INVERTEBRATA, *in-ver-te-brai'-tă*, (Lat. *in*, not; *vertebra*, a joint of the backbone,) in Zool., is a negative term, first employed by Lamarck to designate animals destitute of a vertebral column or backbone. The Invertebrata constitute three out of the four great divisions of the animal kingdom: viz., Articulata, Radiata, and Mollusca. (*See* ANIMAL KINGDOM.)—*Ref.* Professor Owen's *Lectures on the Invertebrate Animals.*

ISINGLASS, *i'-zing-glăs*, a very pure form of gelatine or animal jelly, prepared from certain parts of the entrails of several fish. The best isinglass is prepared in Russia, from the membranes of the sturgeon, especially from its air-bladder or sound, which is very large. When removed from the fish, they are washed with cold water, and exposed to the air for a short time, to make them stiffen. The outer skin is then removed, and the remainder cut out, and twisted loosely into rolls, according to the size required. These twisted rolls are called "staples," and are known commercially as long and short staples. The first of these is dried in the air, and is considered the best. Isinglass of the purest kind is used in confectionery, and also largely in refining wine and beer. Isinglass is almost without colour, taste, or smell; is usually in thin pieces; and is soluble in water. It is dissolved readily by most acids, but it is not soluble in alcohol. The annual importations of isinglass into this country, from Russia, Brazil, the East Indies, Prussia, Guiana, and other places, amount to about 180,000 lbs. Though commonly derived from *ice* and *glass*, the term is probably a corruption of the German correlative term, *häusingblase.*

ISOPODA, *is-op'-od-a*, an order of single-eyed crustaceans, having the body flattened, the abdomen large, of which several segments are fused together, and mostly fourteen legs.

ITHAGINIS. (*See* FRANCOLIN.)

IVORY, IVORY MANUFACTURE, *i'-vo-re*, (Fr. *ivorie*,) the substance which composes the teeth or tusks of elephants. Ivory is largely used in the arts for making or ornamenting a great variety of small articles in general use. The west coast of Africa and Ceylon are the districts from which the principal supplies of elephants' teeth to this country are obtained. The Cape of Good Hope, Madagascar, Siam, and the coast of Barbary, also supply us with ivory. Fossil ivory is also sometimes exported from Russia to England. The trade in ivory has greatly increased of late years, and as much as £20,000 worth is sometimes shipped from Alexandria in one cargo. This portion of the trade chiefly consists of wild elephants' tusks, which have been shed in the Arabian deserts, and bought up by the pacha of Egypt for sale in England. Although the ivory made from elephants' tusks is the best, varieties are also made from the teeth and tusks of the hippopotamus, wild boar, and narwhal. The fossil mammoth of Siberia furnishes the Russians with a kind of ivory very similar to that furnished by the elephant of the present day. Mammoth tusks are sometimes obtained ten feet long, weighing nearly 170 lbs., and solid to within six inches of the end. *Vegetable ivory*, as it is called, is the seed of a genus of plants named Phytelephas, (Gr. *phuton*, a plant; *elephas*, ivory,) occurring in South America. The natives have used these seeds from time immemorial for making buttons, heads to walking-sticks, and various trinkets. It is only within a recent period that they have been brought to Europe. They are not so useful as ivory for delicate purposes; but they are used in the manufacture of a number of articles.

IXODES. (*See* TICKS.)

J.

JABIRU, *ja-bee'-ruh*, a gigantic stork of Australia, having the point of the enormous beak slightly turned up. It sometimes reaches the height of five feet, and is beautifully coloured with deep green on the head and neck, shot with violet and purple. The back is brown, shot with golden-green, and the under parts are pure white. Its scientific name is *Mycteria australis.*

JACAMAR, *jăk'-ă-mar*, (*Galbula*, Brisson,) a name applied to a genus of birds allied to the kingfishers, by their elongated, sharp, quadrangular bill, and by their short feet, whose anterior toes are for the most part united; nevertheless, these toes have not the same formation exactly as in the kingfishers. The plumage also of the jacamars is not so smooth as that of the kingfishers, and has always a metallic lustre, which it is almost impossible to imitate by art. They live solitarily in humid woods, feed on insects, and build their nests on low branches. Most of the true jacamars are natives of tropical America. There are some found in the Indian Archipelago, whose bill, shorter, thicker, and a little bent, approximates them to the bee-eaters. To these

Le Valliant has given the generic name of *Jacamerops*.

JACANA, *jăk-an-âh*, a group of birds remarkable for the very great length of their toes, which spread over a large surface, and permit the bird to walk on floating weeds. They have several characteristics in common with the Rails. The Brazilian species (*Parra jacana*) is common in the lakes and rivers, generally walking in long trains. The Chinese species (***Hydrophasiaus sinensis***) is remarkable for its long and pheasant-like tail; that of the American species being very short.

JACARE, *ja-kâ'-reh*, a species of Brazilian alligator, having a ridge from eye to eye, fleshy eyelids, and small webs to the feet.

JACCHUS. (*See* MARMOSET.)

JACK. (*See* PIKE.)

JACKAL, *jăk'-awl*, (Arab. *tschakkal*, Fr. *chacal*,) a species of wild dogs, the *Canis aureus* of Linnæus. The dental formula of the jackal is that of the dog. The pupil of the eye is round, like that of the dog and wolf. In colour it is yellowish gray above and whitish below; the thighs and legs are yellow, the ears ruddy; the muzzle very pointed; the tail hardly reaching to the heel. The jackal is gregarious in its habits, hunting in packs, frequently attacking the larger quadrupeds, but more commonly preying on the smaller animals and poultry. Its cry is very piercing and peculiar, and travellers describe it as being somewhat appalling when heard for the first time at night. Says Captain Beechy, in his remarks upon this animal:—"We hardly know a sound which partakes less of harmony than that which is at present in question; and, indeed, the sudden burst of the answering long-protracted scream, succeeding immediately to the opening note, is scarcely less impressive than the roll of the thunder-clap immediately after a flash of lightning. The effect of this music is very much increased when the first note is heard in the distance, (a circumstance which often occurs,) and the answering yell bursts out from several points at once, within a few yards or feet of the place where the auditors are sleeping." Jackals are said to devour the corpses left on the field of battle, and to scratch away the earth from shallow graves, in order to feed on dead bodies. The belief that the jackal is the lion's provider, probably arose from the notion that the piercing cry of the pack gives notice to the lion that prey is on foot. The disagreeable odour of the jackal is one of the reasons why it has not been reduced to a state of domesticity. It interbreeds, however, with the common dog; its period of gestation is the same, and the hybrid progeny is fertile. The jackal is an inhabitant of India, and other parts of Asia and Africa. It is believed by some that the three hundred foxes between whose tails Samson is said to have put firebrands, in order that they might set fire to the crops of the Philistines, (Judges xv. 4, 5,) were jackals. There are several species of jackals, one of which, the Black-backed jackal, is a really handsome animal, on account of the richly mottled colours of the back.

JACKASS, LAUGHING, (*Dacelo gigas*,) a large kingfisher of Australia; it is in the habit of uttering cries similar to the laughter of a maniac. It mostly utters its cry at night; and before its habits were known terrified the colonists sadly. It is about eighteen inches in length, and is olive-brown in colour, variagated with black and white. Specimens have been kept alive in this country.

JACKDAW, *jăk'-daw*, (Ang-Sax.,) (*Corvus Monedula*, Linn.,) a common English bird of the crow kind, very much resembling the rook, particularly in its sociability. Jackdaws live together in considerable numbers throughout the year, and, whether seeking for food or rearing their young, they always appear to live in perfect harmony. The length of the jackdaw is about thirteen inches, with a black bill and white eyes; the hinder part of the head and neck of a hoary-gray colour when the bird is full-grown; the rest of the plumage of a rich glossy black above, beneath dusky; the legs are black. The jackdaw is much more bold and familiar than the rook, approaching nearer to the residence of man, and sometimes taking shelter under his roof. It has also an aspect of greater cheerfulness, and there is more activity in its movements. Cultivated districts are preferred by jackdaws, and they frequent and build in church-towers, belfries, and steeples. The female lays from four to six eggs: these are usually produced in May, and the young are hatched by the end of the month, or early in June. The eggs are of a pale bluish-white, spotted with ash-colour and clove-brown. The young birds are easily tamed, and become much attached to those who feed them. Very soon they begin to imitate the sounds of the human voice, and exhibit other amusing qualities. These birds are not particular as to the quality of their food, eating, indiscriminately, insects, seeds, grain, eggs, or carrion; on the sea-shore shellfish, or the remains of other fish and crustacea. They may be seen perched on the backs of sheep, gathering wool for their nests, or picking out parasitic insects. Jackdaws are notorious thieves, not only stealing food, but appearing to have a particular predilection for shining substances, as money, &c. On account of this propensity, they have frequently occasioned suspicions of theft in persons who were afterwards proved innocent. They carry this little weakness so far, that they have been known to purloin spectacles from persons who were in the act of reading. The jackdaw is not only found in this country, but also farther north, in Denmark and Scandinavia, in Russia, Western Siberia, and Iceland. It does not exist in America, but is to be found in Germany, France, Italy, and the northern shores of Africa. It is also found at Corfu, Sicily, Malta, and Crete.

JAGUAR, *jăg'-war*, (*Felis onca*, Linn.,) a large and beautiful leopard found in the New World. The form of the jaguar is robust, stouter than that of the leopard, and strongly and almost clumsily built. The body is thicker, the limbs shorter and fuller, and the tail barely reaches the earth when the animal stands well upon its feet. The head is larger, and somewhat shorter than that of the leopard, and the profile of the forehead is more prominent. The animal is said to measure from four to five feet from the nose to the root of the tail when full grown. On the whole of the upper part of the body it is of a bright yellowish fawn-colour, which passes, on the throat, belly, and inside of the legs, to a pure white. Upon this ground, the head, limbs, and under-surface are covered with full black spots of different sizes; the rest of the body is covered with annular patches, either having a black point in the centre, or formed of small black spots arranged in a circular form. The jaguar is a native of South America,—Paraguay and the Brazils principally; but it is said to have been met with in all parts between the Isthmus of Darien and the southern extremity. Anatomically, the jaguar presents an immense volume of chest when contrasted with the abdominal cavity,—a circumstance which furnishes an index to the habits and vital energy of these active and ferocious animals. The following circumstance, narrated by D'Azara, gives a notion of its power of swimming, as well as of its enormous strength:—"A jaguar, after having attacked and destroyed a horse, carried the body of his victim to the bank of a broad and rapid river about sixty paces distant, over which he swam with his prey, and then dragged it into the neighbouring wood." This was all witnessed by the man whom D'Azara had placed in concealment in order to watch. The jaguar is a most adroit climber, and Sonnini states that he saw the scratches left by the claws of one on the smooth bark of a tree nearly forty feet high, without branches. Baron Humboldt also heard the yell of the jaguar from the tops of the trees, followed by the shrill whistle of the terrified monkeys. Possessed of such tremendous powers, the jaguar becomes the terror of the inhabitants of the countries which he infests. None of the living quadrumana or quadrupeds seem to come amiss to its voracious appetite, and it devours with relish, birds, fish, and even reptiles. The shells of turtles which had been emptied by jaguars were pointed out to Humboldt. Notwithstanding all this ferocity, the jaguar seldom attacks the human race, though he will not shun man when he meets him. Indeed, according to Sonnini and Humboldt, he will often follow travellers. His favourite prey seems to be the larger quadrupeds; such as oxen, horses, sheep, and dogs, which he attacks indiscriminately, and in the same treacherous manner as the rest of the *Felidæ*. When he has made choice of a prey, he springs on its back, and placing one of his paws upon the back of the head, whilst he seizes the muzzle with the other, twists the head round with a sudden jerk, dislocating the spine, and thus killing his victim at once. The inhabitants of South America hunt the jaguar in various ways, either with a pack of dogs or by means of the lasso: the latter mode, however, can only be adopted upon plains or open grounds. Notwithstanding the strength and ferocity of the jaguar, he finds a powerful opponent in the great ant-eater. Although the latter animal has no teeth, whenever he is attacked by the jaguar, he lies on his back, and suffocates or strangles his opponent with his long claws. There is a black variety of the jaguar,—*le jaguar noir* of the French, and probably the jaguarete of Marcgrave.

JANTHINA, *jan thy'-na*, the violet snail of sailors, (*Janthina communis*.) This mollusc has a thin shell of a violet colour, and shaped much like that of the common snail. From the foot proceeds a remarkable structure called the "raft," composed of air sacs, and having underneath a great quantity of egg capsules. A rich blue liquid is secreted by the janthina.

JAY, *jai*, (Fr. *geai*; Sp. *gayo*,) a bird belonging to the family of the Corvidæ, order Insessores, and termed by Beewick the *Corvus glandarius*. Its generic characters may be thus summed up: beak shorter than the head, conical, slightly compressed, straight at the base, with the upper mandible distinctly notched, and suddenly bent over the lower; nostrils basal, lateral, and hidden from view by superincumbent bristles; wings of moderate size, and rounded, with the first three quill-feathers pectinated, while the fourth, fifth, and sixth are of nearly equal length, and the longest in the wing; legs of moderate size; tarsus longer than the middle toe, the outer toe being joined to the middle at its base, and rather longer than the inner one; claws stout, curved, and sharp; tail slightly rounded. The jay is a very handsome bird, well known in most of the well-wooded districts of England. It has been called by the appellation *glandarius* on account of its partiality for feeding on vegetable productions, such as acorns, berries, beechmast, and other similar substances. The jay is generally about thirteen inches in length, and its general colour is a light-purplish buff, which is paler in the under parts. Yarrell observes of this bird, in his "British Birds:" "I have heard the jay perform an uninterrupted song; it mocked the greenfinch most inimitably, and it was a considerable time before I could persuade myself that it was an imitation. But what amused me most of all was its imitation of the neighing of a horse; this was so near the truth, that some companions who were with me were a long time before they could be convinced that the sounds proceeded from the bird. The neighing was very subdued and suppressed, but it bore the most striking resemblance to the neighing of a colt at a distance; indeed, so close was the imitation, that, without a sight of the bird, no person could possibly, I think, be persuaded that the sound proceeded from such an agent. These imitations were accompanied, occasionally, with more subdued and very melodious notes." Besides being common in England, the jay is also found scattered over most parts of Europe; and in America there is also a variety termed the blue jay, (*Garrulus cristatus*,) which is very common in the northern portions of that continent.

JELERANG, *jel'-ĕr-ang*, a fine species of squirrel, (*Sciurus Javanensis*;) it is found in Java, India, and Cochin China. It is variable in colour, but it is commonly dark-brown above, and golden yellow below.

JELLY-FISH, in Nat. Hist., a general term applied to the Medusa, or that division of the class Acephalæ called Discophora, or Palmagrada. All the animals belonging to it are entirely gelatinous, consisting of a large hemispherical disc, more or less convex above, and closely resembling a mushroom or umbrella in shape. (*See* MEDUSA.)

JERBOA. (*See* GERBOA.)

JER-FALCON. (*See* GER-FALCON.)

JOHN DORY. (*See* DORY, JOHN.)

JIGGER. (*See* CHIGOE.)

JUGULAR VEINS, *jew'-gu-lar*, (Lat. *jugulum*, the neck,) in Anat., is the name given to the veins which run down the sides of the neck, and carry the blood downwards from the head. They are divided into external and internal: the two afterwards uniting, and going with the subclavian vein to form the superior *vena cava*, which terminates in the superior part of the right auricle of the heart.

Julus, *jew'-lus*, a genus of myriapoda, in which the horny segments are circular, the antennæ are long, and the feet are fixed to immoveable plates.

Jungle-fowl, *jung'-gl*, (Hindoo,) or *Megapodius tumulus*, a species of birds belonging to the family of the Megapodidæ (large-footed), and its order Gallinæ, a family peculiar to Australia, where they were first discovered. The jungle-fowl is about the size of a common fowl, and the mounds which it rears for the purposes of incubation are said to be very large. In some instances they have been seen fifteen feet high, and are sixty feet in circumference at the base. Mr Gould, in his description of the birds of Australia, says that it is almost exclusively confined to the dense thickets immediately adjacent to the Nathur, and that it appears never to go far inland. It is always met with in pairs, or quite solitary, and it feeds on roots, berries, and insects. The head and crest of the jungle-fowl are of a deep cinnamon-colour, while the back of the neck and all the under surface of the body are a very dark gray; the bill is a reddish-brown, and the tarsi and feet a bright orange.

K.

Kahau, *kâ-haw'*, a monkey belonging to the genus Presbytes, and remarkable for the great length of its nose, which is several inches long, and has the nostrils beneath. It is sometimes called the proboscis monkey. Its fur is bright chesnut-red above and yellow below. The Kahau comes from Borneo.

Kalong, *kay'-long*, a name for the great frugivorous Bat of India.

Kamichi. (*See* Screamers.)

Kanchil, *kan'-chil*, a name for the pigmy musket deer, (*Tragulos pygmous*,) a very small deer, inhabiting the Asiatic islands, and generally found in the dense forests. It may be known by the broad black band that crosses the chest, and runs over the shoulders.

Kangaroo, *kăn-gă-roo'*, a native term applied to an extensive family of animals, distinguished by the female having no placenta, and by their young being nursed in a peculiar pouch in the body of the mother. (*See* Marsupialia.) The scientific term *Macropus* is also used to designate the same family, which varies much in appearance and habits. Some are carnivorous, whilst others live on vegetables. They are nearly all confined to Australia, and are characterised by a very low degree of intelligence. The Phalangers form a sub-family, having the second and third toes so completely included within the skin as to appear like a single toe, were it not for the claws, which project distinctly. They are covered with a close, thick, soft fur, and live on trees or bushes. They have a strong prehensile tail, with which they hook themselves to the branches upon which they doze during the day. They possess a very strong odour, but their flesh is eaten. In the genus Cuscus, the tail is long, scaly, and rat-like, and the ears are short. In the genus Petaurus, the skin of the body is expanded between the anterior and posterior limbs, which enables the species to leap from one tree to another. Four or five species are known, of which the most familiar is the flying squirrel of Norfolk Island. The genus Phascolarctos, or koala, bears some resemblance to the phalangers, but has no tail. The Macropina, or kangaroos proper, have the tarsus and middle toe of the hind foot elongated, and the two inner ones rudimentary, equal, and united together. This genus has very large posterior limbs, and the tail is of remarkable length and strength. This organ is of great importance to the animal, since it is used as an organ of locomotion, a weapon of offence, and also as a third point when the kangaroo rests on its haunches. It also assists in the astonishing leaps which these animals continually take when moving about. Their progress actually consists of a series of springs, sometimes twenty feet in length. They seldom stand on all-fours, except when feeding, and are harmless and inoffensive creatures. The *Macropus major*, or great kangaroo, is the largest species. It measures five or six feet from the tip of the nose to the end of the tail, and, when sitting, appears about the height of a man. The kangaroo forms an important article of food, and the flesh is represented by those who have tasted it as being a little like venison. Soup made of the tail is said to be far superior to the ox-tail soup of Europe. Individual specimens have been brought alive into this country, and have been successfully kept in some of our parks. The great kangaroo inhabits New South Wales, Southern and Western Australia, and Tasmania. Other genera, the Lagorchestes, or kangaroo hare, and the Hypsiprymnus, (*see* Kangaroo Rat,) are also found in Australia. The Dasyurina, or opossums, which also belong to the kangaroo family, are found in America and the West Indies. (*See* Opossum, Macropidæ.)

Kangaroo Rat, (*Hypsiprymnus*,) a marsupial animal found in Australia. It is the size of a rabbit. General colour grayish, reddish-brown above, whitish below; triangular head, large ears; tarsi very long; and tail elongated, flexible, and terminated by a pencil of hairs. The manners of the kangaroo rat are gentle and timid; it feeds upon vegetables, and it is said to burrow in the ground.

Keitloa, *kite-lo'-ah*, native name for Sloare's Rhinoceros. (*See* Rhinoceros.)

Katuka. (*See* Tic-polonga.)

Kermes, *kur'-mees*, a heteropterous insect, which furnishes a scarlet dye, (*Coccus ilicis*.) (*See* Coccus.)

Kestrel, *kes'-trel*, (Ang.-Nor.,) (*Falco tinnunculus*,) one of the most common species of the British Falconidæ. It is elegant in shape, attractive in colour, and graceful in its movements through the air, and is best known by its habit of sustaining itself in the air in the same place, by means of a short but rapid movement of its wings. During this pause, its powerful eyes search the surface beneath for mice, which form its principal food. The kestrel is also called the Windhover, from this habit of remaining suspended in the air. On all such occasions, its head points to windward. Although the kestrel lives principally on mice, it also attacks and devours small birds. The kestrel frequently takes possession in spring of the nest of a crow or magpie in which to deposit its eggs. Sometimes, however, they build in high rocks or old towers. They lay four, and occasionally five eggs. The kestrel is found in nearly all parts of the world. In length, it is from thirteen to fifteen inches, dependent upon the sex. In the male, the beak is blue, pale towards the base; the top of the head and nape of the neck ash-gray, with dusky streaks; the back and wing-coverts reddish fawn-colour, with small black triangular spots, one occupying the point of each feather; the tail-feathers are ash-gray, with a broad black band near the end, each feather being tipped with white; the breast and belly are pale rufous fawn-colour, with streaks on the former and dark spots on the latter; the legs and toes are yellow, and the claws black. The colour of the female differs little from that of the male, the under surface of the tail-feathers of the former being more uniform in colour, and less distinctly barred than in the male.

KHOLSUN. (*See* DHOLE.)

KIANG, *ki-ang*, the wild ass of Thibet, a very active animal, mostly found in the high table lands, and so active that it is not easily taken. It is about thirteen or fourteen hands in height.

KIDNEY, *kid'-ne*, (Ang.-Sax.; Lat. *ren.*,) in Anat., is the name of a double gland, having for its office the secretion of the urine. The form of the kidney resembles that of a French bean; its average length being from four to four and a half inches, its breadth two inches, and its thickness one inch. The two kidneys are situated in the lumbar region, one on each side of the spine, on a level with the last two dorsal and the first two lumbar vertebræ: they are of a brownish-red colour, flattened from before backwards, and grooved on the interior border for the great vessels. They are covered by a thin, firm, transparent cellular envelope; and internally are composed of two substances,—an exterior or cortical, and an interior or medullary. The cortical substance is the seat of the greater part of the secretory process, and is made up of a great number of uriniferous tubes, much convoluted, and inosculating with each other, and lined with epithelial cells of a spheroidal and projecting form. Scattered through the plexus formed by these tubes and the blood-vessels, are dark points, which have been called *corpora Malpighiana*, from their discoverer. These last are convoluted masses of minute blood-vessels included in flask-like dilations of the uriniferous tubes, forming a close relation between the circulating and secreting systems. The medullary substance is composed principally of tubes passing nearly straight inward to the central receptacle of the secretion. Both substances are embedded in interlacing fibres, most abundant in the medullary. The kidneys are well supplied with blood-vessels and nerves, in accordance with the importance of their function. The renal arteries come directly from the aorta, and the large veins terminate in the vena cava. The nerves come from the renal plexus. The renal arteries divide, soon after entering the organs, into minute twigs, which pierce the capsule of the Malpighian tufts. From the convolutions of these tufts arise the efferent vessels, which surround the uriniferous tubes, and from which the renal veins are formed; and thus the urinary secretion is produced from blood which has passed through the Malpighian capillaries. The uriniferous tubes end in a number of conical bundles pointing towards the interior, and are there embraced by membranous ducts proceeding to the central reservoir or pelvis of the kidney, from which arises the ureter, the membranous tube which conducts the renal secretion of the bladder.

KINGFISHER. (*See* ALCEDO.)

KINGCROW, a beautiful bird of India, (*dicrunas maciscercus*,) remarkable for the greatly elongated outer tail feathers. It belongs to the family Ampelide.

KINKAJOU, *kin'-ka-joo*, a remarkable animal allied to the bears and coaitis, and found in Brazil. It is entirely arboreal, can leap to great distances, and has a long prehensile tail, by which it can support itself. It is nocturnal in its habits, and becomes lively just at dusk. Several specimens have been for some years in the Zoological Gardens.

KINOSTERNON, *ky-no-ster'-non*, a genus of mud tortoises found in North America. The tail is thick, pointed, and bony at the tip; the chin is bearded, and the breastbone is divided by two crossing sutures.

KITE, *kite*, (Sax. *cyta*,) in Ornith., one of the Falconidæ, readily distinguished even at a distance on the wing, by its long forked tail. Its flight is characterised by gracefulness and ease, and in some districts it retains the old name of gled or glead, probably derived from the Saxon *glidan*, to glide. Sometimes the kite flies in circles, governing the curve with its rudder-like tail; it then stops, and remains stationary for a time, with its tail expanded widely and its wings fully stretched out. The kite is distinguished from the falcons and hawks generally by pouncing on its prey upon the ground. It preys upon moles, frogs, leverets, rabbits, snakes, and particularly on the young of various gallinaceous birds. Like the sparrow-hawk, it frequently visits the poultry-yard; but it is deficient in courage: hens have been known to drive a kite away by the noise of their cackling. The kite has become comparatively rare in England. Its nest is formed of sticks, and lined with various soft substances, and is usually placed in the forked branch of a tree in a thick wood. It lays two, and sometimes three eggs, of a soiled white colour, marked with a few reddish-brown spots over the larger end. The eggs are laid early in the season, and the birds defend their nest vigorously against all intruders. The principal colours of the feathers are brown, dusky gray, and white. The females are rather larger than the males, but there is hardly any difference in their plumage.

KIWI-KIWI. (*See* APTERYX.)

KLIP DAS. (*See* HYRAX.)

KLIPSPRINGER, *klip-spring'-er*, a beautiful little antelope of Southern Africa, (*Oreotrogas saltatrix*,) inhabiting rocky ground, and being endowed with the sure-footed activity of the chamois. Its colour is dark-brown, sprinkled with yellow, and its height is barely twenty inches.

KNEE, THE, *nee*, (Sax. *cneow*, Ger. *knie*, Dan. *knœ*,) in Anat., is one of the most important joints of the human body, and is formed by three bones,—the lower extremity of the femur or thigh-bone, the upper extremity of the tibia or larger bone of the leg, and the patella or knee-pan, which is situated in front of the joint, and serves to protect it from injury as well as to afford leverage to the muscles of the thigh in moving the leg. It is a small flat triangular bone, anteriorly a little convex and rough, for the insertion of muscles and ligaments; posteriorly smooth, covered with cartilage, and divided, by a middle longitudinal ridge, into two slightly concave surfaces, corresponding with the two convex eminences or condyles of the femur. The entire joint is bound together by a number of ligaments.

KOALA, *ko'-a-la*, a marsupial animal of Australia, popularly called the bear or monkey, (*Phoscolarctos arsinus.*) It is nocturnal, and not very active. Like many other Australian animals, it will allow itself to be captured with perfect unconcern, not resisting in the least. On account of this apathy, it is sometimes called the sloth. Its colour is gray, and the ears are tufted with white.

KOBOOBA, native name for the white Rhinoceros, *q.v.*

KOODOO, *ku-du'*, a magnificent antelope of South Africa, (*Strepoicerus kudu,*) remarkable for its very large and boldly-twisted horns, which have a strong ridge running from base to tip. Its flesh is excellent, and the thin tough hide is greatly used for whip-lashes, thongs, and similar purposes. The colour of the animal is reddish-gray, with some white streaks over the shoulders.

KOOKAAM. (*See* GEMSBOK.)

KORIN, *ko'-rin*, an antelope of Senegal, belonging to the genus Goozella. It is sometimes called the Kevel.

KOULAN. (*See* DZIGGUETAI.)

KRAKEN, or KRAXEN, *krai'-ken*, a name given in the fabulous epoch of natural history to a sea-monster of enormous size. Bishop Pontoppidan, in his "Natural History of Norway," gives an entertaining, if not very satisfactory and accurate, account of this surprising creature. The term, he says, is applied by way of eminence to the fish otherwise called *horven, soe-horven, aucker-troll*, and *kreuzfisch*, which is the largest sea-monster in the world. According to the learned bishop, the kraken is round, flat, and full of branches. "The Norwegian fishermen unanimously affirm, and without the least variation in their accounts, that when they row out several miles to sea, particularly in the hot summer days, and, by their situation (which they know by taking a view of certain points of land), expect to find eighty or a hundred fathoms of water, it often happens that they do not find above twenty or thirty, and sometimes less. At these places they generally find the greatest number of fish, especially cod and ling. Their lines, they say, are no sooner out, than they may draw them up with the hooks all full of fish; by this they judge that the kraken is at the bottom. They say this creature causes these unnatural shallows, mentioned above, and prevents their sounding." The account goes on further to state, that when the fishermen, by their lines, found that the water was getting shallow, they knew that the kraken was raising himself to the surface; whereupon they immediately left off fishing, took to their oars, and got away as fast as they could. "When," he continues, "they have reached the usual depth of the place, and find themselves out of danger, they lie upon their oars, and, in a few minutes after, they see this enormous monster come up to the surface of the water. He then shows himself sufficiently, though his whole body does not appear, which, in all likelihood, no human eye ever beheld, excepting in the case of one of the young of this species, which shall afterwards be spoken of. Its back, or upper part, which seems to be, in appearance, about an English mile and a half in circumference—some say more, but I choose the least for greater certainty—looks at first like a number of small islands, surrounded with something that floats and fluctuates like sea-weed. Here and there a large rising is observed, like sandbanks, on which various small fishes are seen continually leaping about, until they roll off into the water from the sides of it. At last several bright points, or horns, appear, which grow thicker and thicker the higher and higher they rise above the surface of the water; and sometimes they stand up as high and large as the masts of middle-sized vessels. It seems these are the creature's arms; and it is said that if they were to lay hold of the largest man-of-war, they would pull it down to the bottom." These arms are supposed to be tentacula, and the kraken itself to be an enormous polypus. Besides these arms, "the great Creator has given this creature a strong and peculiar scent, which it can emit at certain times, and by means of which it beguiles and draws other fish to come in heaps about it." The young kraken referred to by the bishop seems to have been a young and careless one, which came in among the rocks and cliffs near Alstahoug, in 1680. It appears to have caught hold of some trees standing near the water, and was afterwards found entangled among some clefts of the rocks. From the remarks and conclusions of other naturalists, it seems probable that monsters do exist in the northern seas of which philosophy has not yet dreamed. Mr Maclean, in 1808, reported that he saw, near the island of Coll, an object which at a distance looked like a small rock. Observing it closely, he saw it elevated considerably, and after a slow movement distinctly perceived that which he believed to be the eye of a huge animal. The monster having seen the boat in which Mr Maclean was, gave chase, and pursued it till it reached the shore. This animal seems to have had a broad oval head, with a neck somewhat smaller, its shoulders being somewhat broader; from which point it tapered towards the tail, which was mostly under water. Its length was estimated at between seventy and eighty feet, and it seemed to move progressively by undulations up and down. The appearance described by Mr Maclean bears a close resemblance to the descriptions of the sea-serpent which came from America a few years ago. Whatever the animal may be which gave rise to these descriptions, it seems certain that the animal described by Bishop Pontoppidan cannot be looked upon as a reality. The story probably arose from the observation of floating islands or rocks, only visible at particular times. The young kraken was probably some large sea-monster, the dimensions of which became exaggerated in course of time.

KUDA AYER, native name for the Malayan Tapir. (*See* TAPIRS.)

KUICHUA, *quich-wah'*, a pretty tiger cat of Brazil, (*Lepardus macrourus,*) remarkable for the great length and full bushiness of its tail, which is yellowish-gray, ringed and tipped with black.

KUKANG, *koo-kang'*, native name for the Slow Paced Loris of Java, (*Nycticebus Javanicus*), one of the nocturnal quadrumena. It is gray in colour, and has a dark band along the spine, and surrounding the eyes. The tip of the tongue is deeply notched. (*See* LORIS.)

KUSIMANSE, *koo-si-mans'*, one of the ichneumons of Western Africa (*Crossarchus obscurus*), remarkable for the length of its snout.

L.

LABARRI, *la-bar'-ree*, a deadly snake of Guiana, (*Elaps lemniscatus.*) It sometimes reaches eight feet in length, and is beautifully coloured when living, but fades in death.

LABIDURA. (*See* EARWIG.)

LABRAX. (*See* BASSE.)

LACERTINIDÆ, *lă-ser-tin'-e-de*, (Lat.,) the Lizard family.—Under this title is included a family of reptiles belonging to the order Saura, and characterised by having a round and very elongated body, the tail especially long, being sometimes four times the length of the trunk; four strong feet, with four or five unequal toes, armed with hooked claws; a quadrangular flat head covered with horny plates, and eyes furnished with a membranous expansion, resembling a third eyelid; a wide mouth, and a long, flat, forked tongue. Although they are usually found in the Old World, a small number of species is found in Australia. The Lacertinidæ correspond with the genus Lacerta of Linnæus. They are very nimble in their movements, springing from one spot to another with great alacrity, and cling to and creep along rocks or walls with facility by means of their hooked claws. In their habits they are gentle and timid, and they live in holes in the sand. They are not sociable in their habits, but live in pairs. Great heat or great cold renders them torpid; and their general food consists of insects, worms, small mollusca, &c. The females lay between five and seven eggs, which they leave to be hatched by the warmth of the air. Some of the species are, however, viviparous, and the whole family is long-lived. The scaly lizard, *Zootoca vivipara*, a native of England, is said to hatch its eggs within its own body if it be kept in a dry place, but to deposit eggs if retained in a damp one. The most common species of the Lacertinidæ is the green lizard, *Lacerta viridis*, which is from ten to fifteen inches long, of a rich and varied green colour, with spots and marks of brown and yellow. It is an active animal, feeding upon insects, and pursuing them with great agility. When the tail is broken off, the green lizard has the power of forming a new one. It is found in all the warmer portions of Europe and Asia Minor, and has been met with as far north as the Channel isles.

LACHESIS. (*See* BUSHMASTER.)

LACHRYMAL, *lăk'-re-măl*, (Lat. *lacryma*, a tear,) is a term applied, in Anat., to various organs in the neighbourhood of the eye, and connected with the tears; as the lacrymal glands by which they are secreted, and the lacrymal duct by which they are conveyed away. (*See* EYE.)

LAC-INSECT. (*See* COCCUS.)

LACTEALS, *lăk'-te-ăls*, (Lat. *lac*, milk,) in Anat., is the name given to certain vessels of the human body, on account of their containing a milk-white fluid, the chyle. They serve to convey the chyle, or nutritious part of the food, from the intestines to the thoracic duct. They are very tender and transparent vessels, and are furnished with an infinite number of valves. They have their origin in the internal vellous coat of the small intestines, perforate the other coats, and then proceed through numberless converging branches between the layers of the mesentery, to the thoracic duct, the main branch of the absorbent system, which, at the part where the chief lacteal branches join it, is dilated into what is called the receptaculum chyli. In their passage through the mesentery, the lacteals traverse numerous mesenteric absorbent glands, where they communicate with veins, and the fluid contained in them is exposed to the influence of the blood, from which it acquires colouring matter and fibrin.

LADY-BIRD, or LADY-COW, a well-known little insect, belonging to the family Coccinellidæ, which comes under the class of Coleopterous insects. The lady-bird is distinguished by a hemispherical and convex form of body, by the second joint of the tarsi being large and deeply bi-lobed, and by the colour of the spots on the elytra. Different species are found in various parts of the world, and in England it is common enough. The lady-bird is a very small insect, and its colour is generally red or yellow, with black spots, which vary both in size and number; or it is sometimes black, with white, red, and yellow spots. It creeps very slowly, but flies rapidly; and, when alarmed or caught, it ejects a yellow mucilaginous fluid of a strong disagreeable odour. This insect is very abundant in gardens troubled with *aphides* or plant-lice, which it is very useful in destroying; in hop-plantations, particularly, it is mostly seen. The young lady-birds are grubs of a small flattened appearance, which are produced from little yellow eggs, which the parent insect deposits among the *aphides*; so that, as soon as they are hatched, they are at once within reach of their prey, which they are easily able to destroy.

LÆMODIPODA, *le-mo-dip'-o-dă*, (Gr. *laimos*, throat; *pous*, a foot,) the name of an order of crustaceans, placed by Latreille between the Amphipoda and the Isopoda. The head of this order is confluent with the first segment of the thorax, and supports the four anterior feet. They are described by Latrielle as being the only form among the Malacostraca with sessile eyes, whose posterior extremity does not present distinct tracheæ, and which have hardly any tail. The Læmodipoda have all four setaceous antennæ, carried on a three-jointed peduncle; mandibles without palpi; a vesicular body at the base of four pair of feet at least, beginning with the second or third pair, reckoning those of the head. The body, usually filiform or linear, is composed of eight or nine joints, and the feet are terminated by a strong hook. The eggs of the female are carried in a pouch formed by approximate scales, under the second and third segments of the body. All the species are marine. Among the subdivisions are the Filiformia, which keep among the marine plants and sponges, walk like caterpillars, turn frequently and rapidly on themselves, or set up their bodies while their antennæ continue to vibrate. The subdivision Cyamus has three species, all of which live on the cetacea; and one of them, Cyamus ceti, is also found on the mackerel. It is called, by fishermen, the whale-louse.

LAGOPUS. (*See* GROUSE.)

LAGOTIS, *lag-o'-tis*, a rodent animal found in Peru, where it is popularly called a hare, on account of its long ears. Its long, curling tail, however, separates it from the hares and rabbits. The fur is valueless, as it falls off the skin when handled, but the flesh is excellent.

Lambdoidal Suture, *lăm-boy'-e-dăl,* in Anat., is the suture that unites the occipital to the two parietal bones of the skull, and is so named from its resemblance to the Greek letter *lambda.*

Lamellæ, *lă-mel'-le,* (Lat.,) a term applied in Conch. to those little plates of which the shells borne by crustaceous fishes are composed.

Lamellicornes, *lă-mel'-li-korns,* (Lat. *lamella,* a plate; *cornu,* a horn,) one of the sections of the order Coleoptera, according to the system of Latreille. They have five joints to all the tarsi. The antennæ are inserted in a small hollow in front of the eyes, always short, and usually composed of nine or ten joints, the last of which are large and flat, and open out like a fan. The clypeus is generally very large, and the labrum small and hidden beneath it. The mandibles of several are membranous—a character observed in no other coleopterous insects. The family is numerous, and is noted for the brilliancy of the metallic colours which ornament those species which feed on living vegetables. The larva is soft, somewhat cylindrical in form, with a large vertical head. Six small legs are attached to the thoracic segments, and the body is always bent. Some of them require three or four years to become pupæ. When about to assume the pupa form, the larvæ enclose themselves in an oval case, or one resembling an elongated ball, composed of earth, rotten wood, or other surrounding substances, which they have gnawed and cemented together with a glutinous matter. Their food consists of dung of the various animals, mould, and the roots of vegetables. Some of them live in decayed vegetable and animal substances, upon which they feed. They sometimes destroy immense quantities of vegetables which are useful to man.

Lamina, *lăm'-e-nă,* (Lat.,) meaning a layer, applied to different plates, lying one above another. In Anat., *laminæ* are the two plates or tables of the skull.

Laminæ, *lăm'-e-ne,* the name of a tribe or family of longicorn beetles, distinguished, according to Latreille, by their head being vertical; their palpi filiform, with the terminal point more or less oval in shape, and tapering to a point; the maxillæ have the outer lobe slightly narrowed at the end; the thorax nearly equal throughout, exclusive of the lateral spines or tubercules. Some varieties are *apterous,* a modification of structure possessed by no other family of longicorn beetles.

Lammergezer, *lăm-mer-guy'-zer,* a large predacious bird of Southern Europe and Western Africa, and allied to the vultures. It is sometimes called the bearded vulture. Its expanded wings sometimes measure ten feet from tip to tip. It often feeds by dashing at a goat or chamois, so as to knock it off the cliffs, and then descending to eat the lifeless body. Its scientific name is *Gypaëtos barbatus.*

Lampern, *lam-purn',* a small river fish, allied to the lamprey, and sometimes called the seven holes, in allusion to the respiratory orifices on either side of the neck. In some parts of England it is very common, ascending the streams in great numbers, and blackening the bed of the rivers with its masses. Its scientific name is *Petromyzan fluriatilis.*

Lamprey, *lămp'-re,* (Dan. *lampret,*) (*Petromyzon marinus,*) belongs to the Petromyzidæ, a family of chondropterygious fishes. The lamprey is distinguished by a cylindrical form, compressed towards the tail, and without any scales. It has seven branchial openings on each side, and another small opening connected with them on the upper surface of the head, situated nearly between the eyes; its maxillary ring, or mouth, is supplied with strong teeth, and in the inner disc there are smaller, rasp-like tubercles; its tongue is so formed that, by a movement of the mouth, it acts like a piston, and enables the lamprey to attach itself to any foreign body by means of suction. It is usually about two feet in length and of a yellowish colour, mottled with brown irregular streaks. The two dorsal fins are distinctly separated, the second one joining with the tail-fin, as well as with a small strip which represents the anal fin. Mr Yarrell says, with reference to this fish, that "the lampreys, like the sharks and rays, have no swimming-bladder, and being, also, without pectoral fins, are usually seen near the bottom. To save themselves from the constant muscular exertion which is necessary to prevent them from being carried along with the current of the water, they attach themselves by the mouth to stones or rocks, and were in consequence called petromyzon, or stone-sucker; while the circular form of the mouth induced the name cyclostomes, or round-mouth fishes, which was bestowed upon them by M. Duméril." The lamprey generally quits the sea in the spring for the purpose of spawning, and then returns back to its element after an absence of a few months. It is a fish in high repute as an article of food, and it is, consequently, much sought after for the table. Those from the river Severn are held in the highest esteem, while those from Worcester especially command the market. It is an historical fact that our king Henry I. died from the effects of a surfeit of lampreys.

Lampyridæ, *lăm-pi'-re-de,* (*Lampyris,* Linn.,) a family of coleopterous insects, of the section Malacodermi. The Lampyridæ have five joints to all the tarsi; flexible elytra, with the body usually elongated and somewhat depressed. The head is more or less concealed by the thorax, the mandibles generally small and terminated in a sharp point; the penultimate joint of the tarsi is always bi-lobed, the claws simple, and the antennæ closely approximated at the base. The family of the Lampyridæ contains several genera, the most important of which are,—1. *Lycus,* the distinguishing characters of which are, that the fore part of the head is prolonged into a snout, the antennæ serrated, and the elytra usually dilated in the middle or near the posterior part. A species of this genus is found in England,—the *Lycus minutus;* in length it is about a quarter of an inch, and of a black colour, except the antennæ, which are of a brilliant red. —2. *Omalisus.* This genus has the joints of the tarsi elongated and nearly cylindrical, with the penulitimate joint heart-shaped; the head not sensibly prolonged in front; the antennæ simple; and the elytra tolerably firm.—3. *Omalisus sutularis,* a black variety, closely resembling the insect last described: it is found in France —4. *Lampyris,* the glow-worm. (*See* Glow worm.)

Lancelet, *lanse'let,* a singular little fish

Amphioxus lanceolatis. It is remarkable for being very transparent. The bones are merely gelatinous matter, and there are neither eyes nor ears. It is sometimes dredged off our coasts.

LANDRAIL. (*See* CORNCRAKE.)

LANGAHA, *lan-gă-hah'*, a tree serpent of Madagascar; it has a fleshy-scaled projection on the muzzle.

LANIUS. (*See* SHRIKE.)

LANNER, a large falcon, resident in Northern Europe, and not known to be a British bird. *Falco lanarius.*

LANTERN-FLY. (*See* FULGORA.)

LAPWING, or PEEWIT, *lăp'-wing*, one of the best-known of the British birds, belongs to the Snipe and Plover tribe. The generic characters of this bird, whose scientific name is *Vanellus cristatus*, are,—straight slightly compressed bill, shorter than the head; points of both mandibles hard and horny; legs slender, with lower part of tibiæ naked; four-toed feet —three before, one behind; large wings, tuberculcated or spurred in front of the carpal joint; first three quill-feathers shorter than the fifth. The names which this bird bears have been suggested, the first by the slow flapping of its wings during flight, and the second by its often-repeated note, with which the sound peewit is closely similar. An inhabitant of heaths, commons, and the marshy grounds near rivers or lakes, these birds resort in numerous flocks to certain districts in Norfolk, Lincolnshire, Cambridgeshire, and Essex, where the trade of collecting them for the table continues for about two months.

LARK. (*See* ALAUDA.)

LARUS (*See* GULL.)

LARVA, *lar'-vă*, (Lat, a mask,) a term applied to an insect in its first state after leaving the egg, and previous to its assuming the chrysalis or pupa form. Larvæ are generally known by the names of grubs, maggots, and caterpillars. (*See* INSECTA, INSECT-TRANSFORMATION.)

LARYNX, *lăr'-inks*, (Lat.,) is the name given to the organ of the voice situated at the upper and fore part of the neck, where it forms a considerable projection. It extends from the base of the tongue to the trachea; is narrow and cylindrical below, but broad above, where it presents the form of a triangular box, being flattened behind and at the sides, whilst in front it is bounded by a prominent vertical ridge. It is composed of cartilages connected together by ligaments, moved by numerous muscles, lined by mucous membrane, and supplied with vessels and nerves. The cartilages of the larynx are nine in number, three single and three in pairs; viz., the thyroid, cricoid, epiglottis, the two arytenoid, the two cornicula laryngis, and the two cuneiform. The thyroid cartilage consists of two plates, of a dense, tough, fibro-cartilaginous substance, irregularly quadrilateral in form, and united at an acute angle in front, forming that prominence which is felt in front of the throat called *pomum Adami.* The lower border is connected with the cricoid cartilage, so called from its resemblance to a signet-ring, (Gr. *krikos*, *eidos*, like a ring. It is smaller, but thicker and stronger, than the thyroid cartilage, and forms the lower and back part of the cavity of the larynx. The arytenoid cartilages are each of the form of an irregular triangular pyramid, and are placed upon the upper edge of the broad part of the cricoid cartilage, at the back of the larynx. The base of each cartilage is broad, and presents a concave smooth surface for articulation with the cricoid cartilage. The apex of each cartilage is surmounted by a small conical-shaped cartilaginous nodule,—the corniculum laryngis. The cuneiform cartilages are two small elongated cartilaginous bodies, placed one on each side in the fold of mucous membrane, which extends from the apex of the arytenoid cartilage to the side of the epiglottis. The epiglottis is a thin lamina of fibro-cartilage shaped like a leaf, and placed behind the tongue, in front of the superior opening of the larynx. During respiration, its direction is vertically upwards, its free extremity curving forward towards the base of the tongue; but when the larynx is drawn up beneath the base of the tongue during deglutition, it is carried downwards and backwards, so as to completely close the opening of the larynx. The upper opening of the larynx is termed the glottis. The mucous membrane of the larynx is continuous with that lining the mouth and pharynx, and is prolonged through the trachea and bronchi into the lungs. The vocal ligaments are two narrow bands of dense fibrous and highly elastic tissue, stretched between the anterior angle of the thyroid and the anterior surfaces of the arytenoid cartilages.

LATISSIMUS DORSI, *lăt-is'-se-mus dor'-si*, (Lat. *latissimus*, broadest, and *dorsum*, the back,) in Anat., is the name of a broad flat muscle of the back, which serves to move the humerus downward and backwards, and to turn it upon its axis.

LEAF INSECTS.—A group of Orthopterous insects, belonging to the family Phasmidæ. Those belonging to the typical genus Phyllirum, look exactly like green leaves endowed with life.

LEATHERHEAD. (*See* FRIAR-BIRD.)

LECAMA. (*See* HARTEBEEST.)

LEECH, *leetsh*, (Sax. *laccan*, Lat. *hirudo*, from *haurio*, I draw,) a genus of red-blooded worms, or annelide animals, which have an oblong body, with a sucker at one end and a mouth at the other. In the mouth there are three small jaws, tongues, or plaits of skin, by which they are enabled to extract the blood of other animals, which forms their principal nourishment. Leeches are oviparous, and take nearly five years to arrive at maturity. They are found in ponds and rivers in nearly every country; and derive their chief interest from their use as a remedial agent. The species generally employed for medical purpose belong to the genus Sanguisuga. Of this genus two species are employed in Europe,—*S. officinalis,* the Hungarian, or green leech, used in the south of Europe, and the *S. medicinalis*, the German, brown, speckled, or English leech, used in the north of Europe: the latter variety is now rare in this country, on account of the draining of so many marshes, bogs, and ponds, where it was formerly abundant. The same is nearly the case with France, which is now principally supplied from the frontiers of Turkey and Russia. The large number of leeches used in England are mostly derived from Sweden, Hungary, and Poland. The English, or speckled leech, is composed of from ninety to one hundred rings; is convex on the back, which is olive-green in colour, with six red longitudinal stripes spotted with black. The belly is flat, greenish-yellow, spotted with black. The oral and caudal extremities are narrowed before they spread out into discs or suckers, and the anterior extremity is rather narrower than the caudal. The sucker at the tail is an organ of prehension, or holding, by which the animal is enabled to progress. The leech breathes by pores, which open into small vesicles ranged on either side. The stomach occupies two-thirds of the length of the animal, and is divided into eleven compartments, each furnished with two cæcal sacs; it is closed by a sphincter valve at its lower end. The leech has no heart, but four large pulsating vessels instead, one on each side, one on the dorsal, and the fourth on the abdominal surface. In its native abode, the true medicinal leech seems to take no solid food, but subsists entirely on the fluids of fish, frogs, &c. They are caught in various ways,—by the hand, or by a person wading in the shallow waters during the spring season, when they adhere to his naked legs; but in summer, when they retire to deeper water, a raft is constructed of twigs and rushes, by which a few are entangled. They are sometimes taken by means of decayed animal matter or liver, as bait; but this method is considered injurious to the health of the animal. If active in the water, and plump when taken out, a leech may be known to be in good health. Leeches vary in the quantity of blood which they can abstract, from one drachm to half an ounce: from one to two drachms is the average. When forcibly pulled away whilst sucking, the leech is very apt to leave the teeth, or plaits of skin, in the wound, giving rise to pain and inflammation of the part; the leech is also rendered incapable of biting again. One of the most certain methods of making leeches bite is to cleanse the skin thoroughly; and the leeches should be exposed to the air for a short time previous to their application, as by this means they will bite more eagerly. They may be applied to the part by holding them lightly in the fingers, if they are voracious; or they may be placed in a cup, which should be inverted over the part from which the blood is to be drawn. A leech should not be disturbed whilst sucking, but should be permitted to fall off. When it has dropped off, it should be seized by the tail, and striped between the finger and the thumb, in order to make it disgorge most of the blood, allowing it to retain about one-third,—this is better than applying salt or vinegar to the mouth; it should then be placed in many successive fresh waters, when it may survive, and after many months be again fit for use. The increasing scarcity of leeches renders their propagation and preservation matters of great importance; and large numbers die through errors in the method of keeping them. Leeches have not been observed to propagate when kept in small bodies of water; but in large reservoirs, with a bottom of turf and rushes and clay sides, in which to deposit their cocoons, they have been known to propagate. The consumption of leeches in this country has greatly diminished of late years. A short time ago, four of the principal dealers in London used to import 7,200,000 annually. According to the French official returns in 1847, the number of leeches imported into France was 23,581,680, the value of which was estimated at 353 710 francs.

Leg, *leg*, (Du. *læg*,) is commonly applied to the whole of the lower limb from the hip to the ankle, but which properly belongs to that portion which extends from the knee to the ankle, the upper portion being the thigh. The leg proper is formed of two bones,—the tibia and fibula. The former of these is the larger, and articulates above with the os femur, or thigh-bone, presenting for that purpose two articulating surfaces,—an external and internal, known as the condyles of the tibia, and separated from each other by a large bony prominence termed the spine, and two rough surfaces, one in front, the other behind the spine. Below the articulating surface, and in front, is a large eminence termed the tubercle, which gives insertion to the ligamentum patellæ. On the outer side of the tibia is a projection marked inferiorly by a smooth surface for articulation with the upper extremity of the fibula. The body or shaft of the tibia is large and triangular above, but becomes smaller and more circular inferiorly to the inferior or tarsal extremity, where it expands and assumes a quadrilateral form. Internally it descends farther than in any other direction, forming a projection termed the internal malleolus: externally is a rough triangular surface which gives lodgment to the fibula and attachment to the ligaments which connect these bones together. It articulates below with the astragalus. The superior extremity, or head of the fibula, is round and irregular, and presents, on its inner side, a smooth cartilaginous surface for articulation with the tibia. The tarsal extremity is large, and more prominent than the superior, and forms a large irregular projection of a triangular shape, termed the external malleolus. It articulates with the astragalus. The principal muscles of the leg are the tibialis anticus, extensor digitorum longus, extensor pollicis proprius, peroneus tertius, peroneus longus, peroneus brevis, gastrocnemius, plantaris, soleus, popliteus, flexor longus digitorum perforans, tibialis posticus, flexor pollicis longus.

Leipoa, *lie-po'-ah*, the native pheasant of Australia, (*Leipoa occellata*,) a bird which makes a heap of leaves and earth some three feet in height, and lays its eggs in the middle, leaving them to be hatched by the heat proceeding from the decayed vegetation. About a dozen eggs are found in each nest. The general colour of the Leipoa is dark ash gray, variegated with black streaks on the back. In size it is equal to a small turkey.

Lemming, *lem'-ming*.—The *Myodes norvegicus* is a native of Norway and Finland. It belongs to the family Murina, which includes the mouse, rat, and other similarly formed animals. It is about five inches in length, with a tail about half an inch long, and is of a tawny colour, variegated with black. In its habits, the lemming is extremely peculiar. It subsists entirely on vegetable food, and lives in shallow burrows under ground in summer, and makes long passages under the snow in winter. In Baird's "Cyclopædia of the Natural Sciences," its peculiar habits are thus described:—"The most remarkable feature in the history of the lemming is the periodical emigrations the animals make from one part of the country to another. They descend in great bands from the mountains which divide Nordland and Finmark, eating up everything before them. They pursue their course in a straight line, climbing walls and houses, and not avoiding man himself, should he stand in their way; but attempting to climb over him. Rivers and lakes are swum across, the band forming again on the other side, and corn and hay stacks are gnawn through. Like an army of locusts, they pass on, leaving a desolate track behind them; nor do they stop till they reach the sea, where thousands are drowned. During their march, great numbers are destroyed by hawks, owls, weasels, &c.; and so great is the havoc thus committed, and by their being swept away in crossing rivers, and by similar casualties, that but few ever reach their native haunts again. The cause of these migrations is not well known, but is supposed to arise from want of food. They appear to take place at irregular intervals; but, upon an average, about once in ten years." In former times, the lemmings were superstitiously regarded by the peasants of the countries they went over, the popular belief being that they fell from the clouds; and in such dread were they held, that it used to be the custom for priests to exorcise them with bell, book, and candle.—*Ref.* Baird's *Cyclopædia of the Natural Sciences*.

LEMUR, *le'-mur*, (Lat. *lemur*, a ghost,) a term formerly applied, in the Linnæan system of zoology, to several of the lower quadrumanous animals of different structure and habits. However, it is now restricted to such as have the inferior incisors long, compressed, and sloping forwards, and the lower canines approximated and of similar form and direction. "Each of the four extremities is provided with an opposable thumb; but the index digit of the hinder hand has its nail developed into a long curved sharp-pointed claw." The lemurs are natives of Madagascar, and of some of the smaller islands in the immediate neighbourhood. Their food is composed of a mixed diet of fruits, insects, and small birds, they being able to surprise the latter while at roost during the night-time. (*See* FLYING LEMUR.)

LEO. (*See* LION.)

LEOPARD, *lep'-pard*, (*Felis leopardus*,) a name applied to the larger spotted cats, (*Felidæ*,) which are found both in the Old and New Worlds. In the continent and islands of the Old World, the leopard appears to have its most perfect development; but the American jaguar far excels the leopards of Asia and Africa in size, strength, and sturdiness of make. There is much discrepancy of opinion among naturalists as to whether the leopard and panther (*Felis pardus*) are distinct species or only varieties. Cuvier separated the panther from the leopard specifically. He describes the panther as being yellow above and white beneath, with six or seven rows of black spots, formed by a cluster of five or six simple spots on each side. He speaks of the species as being found all over Africa, in the warm countries of Asia, and in the Indian Archipelago. The leopard is referred to as differing from the panther in having ten rows of smaller spots. Linnæus, however, could not see sufficient grounds of distinction between them, and referred both names to one and the same animal. (*Felis leopardus*.) The leopard properly so called is a beautiful but savage animal, and is spread over the African continent as widely as the lion. Over this vast extent, he varies little, and that merely in magnitude and in the size and form of his markings and their depth of colour. Everywhere, however, he is the same in respect to form and structure, disposition and character. The general colour of the leopard is yellowish fawn, which grows paler in the sides till it merges into the white of the under part of body. Over the head, neck, back, and limbs are scattered black spots of various sizes; while the sides are covered with numerous rose-shaped spots. The leopard's general aspect is fierce, and its disposition is characterised by all the fierceness and craftiness which is noticed in the rest of the cat tribe. He preys upon antelopes, monkeys, and the smaller quadrupeds; but avoids man except when closely pursued, when he fights obstinately. Leopards have been known to attack solitary travellers. When they fall in with a flock of sheep, they commit almost incredible slaughter. Two leopards, a male and female, with three young ones, have been known to enter a sheepfold near the Cape of Good Hope, when the old animals killed nearly a hundred sheep. After having gorged themselves, they fed their young, and each seizing a whole carcass tried to carry it away; they were waylaid, however, and killed. The mode by which the negroes capture the leopard is by digging pitfalls and slightly covering them with hurdles, over which a piece of meat is laid as a bait. From the great flexibility of the limbs of this animal, he is able to ascend trees with great ease, and when pursued, is in the habit of taking refuge among the branches. He can be somewhat tamed when taken very young. According to the accounts of African travellers, the flesh of the leopard is excellent, resembling veal in flavour. The skins are valuable for making rugs, &c., and are sold in Europe at from £5 to £10. Among the larger spotted cats of the Old World is the rimau-dahan, which partakes, in some measure, of the markings of the tiger and leopard, though it seems to be more allied to the former than to the latter. Its probable size, when full-grown, will be about four feet from the nose to the root of the tail; and its height, at the shoulder, about one foot ten inches. Its colour is brownish gray, with no yellow or red tints. Its spots and stripes are large, dark, irregular, and oblong in form; the larger ones being marked by lines of velvety black. It inhabits Sumatra. According to Sir Stamford Raffles, who made personal observations on two individuals of the species, while young, these leopards are very gentle and playful. He brought one specimen alive to England; but it died shortly after its arrival, during the process of dentition. "On board the ship," he relates, "there was a small Musi dog, who used to play round the cage and with the animal; and it was amusing to observe the playfulness and tenderness with which the latter came in contact with his inferior-sized companion." This specimen was taken very young in the forests of Bencoolen. The natives assert that the rimau-dahan never attacks man, but lives principally upon poultry, birds, and the smaller kinds of deer; and that it sleeps, and often lays in wait for its prey, on trees; from whence it derives the name of *dahan*, which signifies the fork formed by the branch of a tree. One of the most interesting forms of division of the *Felidæ* is the chetah, or hunting leopard

(*Cynailurus or Gueparda jubatus*); it is inferior in size to the leopard proper, not being more than thirty-two inches high; besides which, his limbs are not so graceful, nor his fur so sleek as the majority of the cat tribe. The chetah is of much lighter build than the panther, shows better fight when hunted with dogs, and commonly inhabits the lower branches of the great trees of the forest, where the female brings forth her young. It is common with the European inhabitants of Ceylon to style the leopard there found, chetah; but the true breed of hunting-leopard does not there exist. Whether the chetah is taken as a cub, and trained to the business of deer-hunting, or whether, as a full-grown animal, it may be trapped and broken in, does not seem clear; it would, however, seem most probable that the former system was adopted; for although we have instances of leopards and panthers becoming so far docile as to tolerate the society of man, it requires the utmost care that they do not relapse to their naturally ferocious habits. When the trained chetah is required for a day's sport, he is placed in a sort of cart, drawn by a horse, and accompanied by the hunters and the usual company that belong to the chase in India. When an antelope is started, it is shown to the chetah in the tumbril, who, as soon as his leash is slipped, leaps after it. The speed of the deer is much greater than that of the chetah; but it invariably happens, that as soon as the former becomes aware of its terrible pursuer, it becomes panic-stricken, and its swift and regular paces change to spasmodic leaping and stumbling, while the chetah, eager for the sanguinary reward for his service, increases his speed, and is presently on the back of the struggling animal, with its fangs buried in its throat. The hunters hasten up with the chetah's hood and chain, and after he has been enticed from the deer by the offer of pieces of meat, the hood is slipped over his eyes, and he is led back to the tumbril and held till fresh game is started. The behaviour of the chetah in confinement is that of an ordinary savage dog. The chetah in its external form and habits presents a mixture of the feline and canine tribes; from whence it derives its name of *Cynailurus*, from the Greek *kunos*, a dog. The jaguar, (*Felis Onça*,) or American panther, is the form which the leopard takes in the New World. (*See* JAGUAR.)

LEPAS, *le'-pas*, the genus of Cirrhipeds, in which are included several barnacles, especially the well-known goose barnacle, which adheres to ship's bottoms and floating timber. (*See* BARNACLE.)

LEPIDOPTERA, *lep-ĭ-dop'-ter-ă*, (Gr. *lepis*, a scale; *pteron*, a wing,) an order of insects which contains those generally known by the name of butterflies and moths. They have four membranous wings, covered on both sides with minute generally coloured scales, which appear to the naked eye like a quantity of fine dust scattered over them. They possess also a long proboscis, or trunk, rolled up spirally; and two antennæ, generally long, of variable form. The Lepidoptera undergo perfect metamorphosis. In general, the females are rather larger than the males, and their colour less brilliant. In the *imago* state they are very short-lived; the males die shortly after the act of generation is accomplished, and the female soon after she deposits her eggs. The nectar of flowers forms their principal food, and they suck it up from the depths of the narrowest blossoms by means of their proboscis, which is wonderfully adapted for the purpose. The females of different species lay their eggs upon different plants, according to the proper food required for the young caterpillar. Thousands of eggs are sometimes laid by one insect, and they are made to adhere to the surface of the leaf on which they are deposited. The larvæ of the Lepidoptera are well known by the name of caterpillar. When ready to be hatched, they come out in a worm-like form, the body being cylindrical and composed of thirteen segments. They have three pairs of simple articulated feet, which serve the purpose of walking; and from two to five pairs of false legs, short and thick, armed at the end with hooks, which enable the animal to fasten itself on leaves, branches, &c. Most of these larvæ move forwards, but some walk backwards, with a sort of leaping motion; while others draw the body into a loop-form, then suddenly straightening, spring forwards with an energetic bound. During this state of their existence, they do considerable damage to trees, shrubs, &c., and change their skin several times. They then cease feeding, and change into the chrysalis or pupa state. (*See* INSECT-TRANSFORMATIONS.) When the perfect insect emerges, the wings are at first moist and unexpanded; it then appears weak; but, soon after being exposed to the air, its wings become dry and expand, and the insect seems full of life and activity. There are supposed to be about 12,000 species of Lepidoptera, or nearly one-sixth of all the insect tribes. More than 2000 are said to be natives of Britain. They present many points of interest to the entomologist, especially in their larvæ and their pupa state; while the beauty and elegance of the forms of the perfect insects are admired by all. The value of the silk cocoons of the pupæ of certain species is almost equal to the damage done by the larvæ of others. The Lepidoptera have been divided into three large classes; the *Diurna*, or those which fly by day; the *Crepuscularia*, or those which fly in the evening; and the *Nocturna*, or those which fly by night. Many of the Nocturna, however, fly by day, and *vice versa*; in consequence of which another arrangement has been adopted, based upon the construction of the antennæ. In the butterflies, the antennæ are always club-shaped at the extremity; they are, therefore, classed in the group Rhopalocera, club-horned. The moths, on the contrary, never have the antennæ with club-shaped ends; they are generally setaceous, filiform, fusiform, or pectinated; they have been, consequently, classed in the group Heterocera, varied horned.

LEPIDOSIREN, *lep'-e-do-si'-ren*, (Gr. *lepis*, a scale,) the Mud-eel, an animal which in late years has given rise to much discussion among naturalists, as to whether it belongs to the class of reptiles or fishes. It is one of the most perfectly amphibious of all animals. Its organs of respiration are twofold. As in all fishes, it has well-organised gills on the inner edge of the branchial arches, and a regular gill-cover, with a small oblong aperture in front of the base of the anterior members. Besides these, it has two well-developed cellular lungs of nearly equal size. The body is elongate and fish-like in form, covered with oval imbricated scales, and furnished with dorsal and caudal membranes resembling fins, strengthened with soft-jointed rays. According to the supporters of the reptilian theory, these members are feet; while those who regard the animal as a fish look upon them as fins. Two species of Lepidosiren are known,—the *L. paradoxa* and the *L. annectans:* the former is found in the Amazon and the latter in the Gambia. Several living specimens of the animal found in the Gambia have been brought to this country. During the inundations of the river, large portions of the country are flooded; upon the retreat of the waters, the lepidosirens that are left behind burrow into the mud. The sun soon converts this into a hard cake, and they remain cased up in a sort of cocoon of dried mud. They remain torpid, and covered with a thick secretion or mucus, till the rainy season again commences, and the flooded river releases them. A short time ago, several of these animals were brought over to this country in their hard cocoons, and afterwards exhibited alive at the Crystal Palace at Sydenham. One of these specimens lived for three years, and increased from ten inches in length and a few ounces in weight, to thirty inches in length and six pounds and a quarter in weight. The natives eat the lepidosirens, and it is said that, when fried, they closely resemble eels in taste, and have a rich oily flavour.

LEPIDOSTEUS. (*See* PIKE, BONY.)

LEPTOCEPHALIDEE, *lep-to-kef-il'-id-dee*, a family of Malacepterygian fishes, which are small, scaleless, transparent, and very flat. They are popularly called glass eels.

LEPRALIA. (*See* FLUSTRADÆ.)

LEPUS. (*See* HARE.)

LEROT, *le-roh'*, name for the garden dormouse, (*Myoxus guercinus*,) a little rodent, which is apt to enter gardens and orchards, and make great havoc among the fruit. Like the common dormouse, it is a hibernater, but is partly social, six or seven individuals crowding into one recess.

LEUCISCUS. (*See* ROACH.)

LIBELLULA. (*See* DRAGON-FLY.)

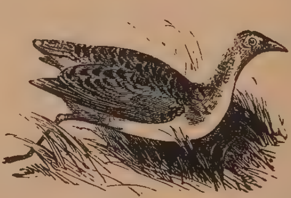
LIFE, *life*, (Sax. *lif*, *lyf*,) is defined to be that "state or condition of a being that exhibits vital action;" and it is thus placed in opposition to the term death, which implies the state of a being in which those actions have altogether ceased, and whose structure is subject to no other forces than those of inorganic matter, which speedily effect its decomposition. The class of phenomena to which we apply the term vital, and which differs in its character both from those of physics and chemistry, is only manifested by bodies of that peculiar structure which we term organised. It was long regarded as sufficient to attribute to the vital principle all those actions of a living body which cannot be referred to the laws of chemistry or physics. The laws of vital phenomena, however, are, in fact, as open to investigation as those which comprehend the phenomena of gravitation, electricity, or chemical affinity. A strict examination into their character will show that, although not identical with physical phenomena, they are analogous to them, in so far as they take place according to a regular plan, and present themselves under fixed conditions, a definite acquaintance with which would give to physiological science the same kind of precision and comprehensiveness as it is the aim of the physical philosopher to attain in his branch of study. The intricacy, however, of the combinations under which the vital phenomena are usually presented to our observation renders a knowledge of their laws more difficult of attainment; but the success which has attended the philosophical method of inquiry of late pursued by scientific physiologists, is a most satisfactory proof that they are not beyond the reach of persevering and well-directed search. Life commences with the first production of the germ; it is manifested in the phenomena of growth and reproduction; and it terminates in the death of the organised structure, when its component parts are disintegrated more or less completely by the operation of the common laws of matter. Life is thus "the sum of the actions of an organised being." It includes all those phenomena which it is the province of the physiologist to consider. (*See* PHYSIOLOGY.) The changes exhibited by any one living being, in its normal condition at least, have one manifest tendency,—the preservation of its existence as a perfect structure. By these it is enabled to counteract the ever-operating influence of chemical and physical laws, and to resist to a greater or less extent the injurious effects of external agencies. In the investigation of vital phenomena, the fact has been too much overlooked, "that we always find a similarity of action when the organised structure on the one hand, and the stimuli which call its properties into activity on the other, are identical; and a difference in either of these conditions always produces a difference in the result." We do, indeed, occasionally find variations in the result, without being able to detect any change in either of the conditions; but knowing how very imperfect our powers of discovering minute changes at present are, and bearing in mind that every increase of our means of observation has gone to strengthen the force of our rule, we cannot look upon them as exceptions. In attempting to reduce the mass of phenomena presented to us by vital actions to distinct classes, we find that all living beings introduce into their own structure alimentary substances derived from external sources; and likewise that all submit their fluid ingredients to the influence of the element which they inhabit, so as to produce a reciprocal change between them. Thus, the function of respiration is essentially the same throughout the whole organised world. Hence we conclude that the action of each particular organ is dependent upon the excitation of its properties by agents external to it. When these stimuli are withdrawn, vital action ceases. Farther, every class of organs in the living body may be said to require its particular stimulus for the display of its properties. There are also other conditions of a more general nature necessary for the support of vital actions. All vital actions require a certain amount of heat for their performance, and this amount varies in different cases. Light, again, is essential to many others, especially in the vegetable kingdom. Electricity is also an important agent in the vital economy; but our knowledge of its operations is still very imperfect. Many physiologists argue for the existence of a distinct set of vital affinities, from the fact that the tissues and fluids which maintain a certain composition when possessed of vitality, rapidly resolve themselves into new combinations

LAMPREY.

LAMPERN.

RING-TAILED LEMUR.

LINNET.



LANDRAIL.

when this has become extinct; but there appears to be more reason to infer that the preservation of the normal constitution of organic compounds in the living body is dependent on the continuance of the vital actions of the economy, rather than due to its mere possession of the property of vitality. In fact, it may be reasonably maintained "that the vitality of each tissue, that is to say, its possession of vital properties, is dependent on the perfect condition of its organisation; and that, so far from preserving the organism from decay, it merely remains until decay has commenced." There are many organised beings, at particular periods of whose existence all vital action seems to be suspended; and this may result either from the absence of the stimuli necessary to maintain it, or from some change in the organism itself, by which it is, for a time, less capable of responding to these stimuli. The former is manifested in a remarkable manner in the case of seeds of plants, which have been found to preserve their vitality during many centuries; the latter, in the case of certain animals which pass the winter in a state of torpor.—*Ref.* Todd's *Cyclopædia of Anatomy and Physiology;* Carpenter's *Principles of Physiology;* Carpenter's *Principles of Human Physiology;* Muller's *Elements of Physiology.*

Ligament, *lig′-ă-ment*, (Lat. *ligamentum*,) in Anat., is a strong elastic membrane connecting the extremities of movable bones. They are divided into capsular and connective, the former surrounding the joints like a cap.

Limax. (*See* Slug.)

Limnæa, *lim-nee′-ah*, a genus of Gasteropoderous molluscs, in which is included the well-known pond or water snail. The shell is thin and ample, and the lip is sharp and rounded.

Limnoria. (*See* Gribble.)

Limosa. (*See* Godwit.)

Limpet, *lim′-pet*, a well-known group of Gasteropoderous molluscs, which have shells of a basin-like shape, and which cling firmly to rocks and stones, preferring those which are situated between high and low water mark. The common limpet, (*Patella vulgata*,) is much used for bait by fishermen. There are several allied molluscs, which are popularly called limpets. There is, for example, the Cup-and-saucer limpet, (*Calyptræa audis*,) so called on account of a cup-like projection in the interior of the shell. The Keyhole limpet, for which *see* Fissurella. The Duck-bill limpet, (*Parmophorus australis*,) so called because it is shaped like a duck's beak; and the Bonnet limpet, (*Pilepois*,) which is shaped like the "Cap of Liberty."

Ling, *ling*, (Du. *leng*,) (*Lota molva*,) a well-known and valuable fish, belonging to the family of the Gadidæ, (Codfish family.) In addition to the generic characters of the Gudidæ, which will be found given under article Hake, it possesses the following especial one; namely, that it has a chin with one or two barbules upon it. The body of the ling is a little more elongated than the hake, being usually from three to four feet long. The back and sides are of a gray colour, somewhat inclining to olive, although occasionally cinereous; the under portion of the body silvery; ventrals white; dorsal and anal fins edged with white; and, lastly, the caudal, marked near the end with a transverse black bar, the extreme tip, like other fins, being white. The ling is naturally an inhabitant of the northern seas, like the rest of its family. Great quantities of them are taken round the Western islands, in the Orkneys, and on the Yorkshire and Cornish coasts. The mode of fishing for ling is by means of hand-lines and long lines; and besides a portion that is consumed fresh, the fish are split from head to tail, cleaned, salted in brine, washed, and dried. The demand, however, often falls short of the quantity cured; and thus the fishermen are poorly requited for their toil and outlay. The ports of Spain are the markets generally supplied; and so important an article of commerce was it considered, that an act for regulating the price of ling, cod, hake, &c., was passed. The air-bladders of the ling are, like those of the cod, prepared separately, and are sold under the name of sounds. When in season, the liver abounds with a fine oil. In 1854 it was calculated that the take in Scotland of cod and ling amounted to 3,523,269 fish, of which 1,385,699 were from the Shetland Islands. Of these 109,684 cwt. were cured and dried, and 6166 barrels were cured in pickle; whilst 58,042 cwt. were disposed of fresh; making a total of 167,726 cwt. cured or fresh; of which large quantity 19,577 cwt. were exported. Mr Yarrell observes of it, "In Zetland, the principal fishing for ling is from May to August. On the Yorkshire coast, the young are called drizzles. In Cornwall, they are caught in January and February, and their favourite haunts are about the margins of the rocky valleys of the ocean. The ling is exceedingly prolific, and of most voracious appetite, feeding on young fish, not sparing anything that has life, and the prey is swallowed whole; so that no great art is required to catch it. It is tenacious of life, and survives great injury." (*See* Hake.)

Linnet, *lin′-net*, (Fr. *linot*, Sax. *linetwcge*,) a bird belonging to the family Fringillidæ, order Incessores, division Corvirostres. Its characteristics have been described under the article Fringillidæ, and therefore they need not be here alluded to. The common linnet (*Linota cannabina*) is well known in England, where it is sometimes also called the brown linnet, or rose linnet. The male of this bird, in summer, has the beak of a bluish lead-colour, the irides hazel; the feathers of the fore part and top of the head grayish-brown at the base; but vermilion-red at the top; round the eye, the ear-coverts, and back of the neck, grayish-brown; the whole of the back, wings, and upper tail-coverts, uniformly of a rich hesnut-brown; the quill-feathers are nearly black, with narrow outer margins of white; tail-feathers black, with narrow outer edges, and broad inner ones of white; the chin and throat are coloured with a mixture of brown and gray; the breast is vermilion-red, with a few pale brown feathers intermixed; the flanks and remainder of the bird are in general brown, including the legs, toes, and claws. In winter and autumn the linnet has no red colour on the head or breast, and the plumage is altogether of a more dusky hue than in summer. The female bird is a little smaller than the male, and the colour of its plumage is much lighter also. The mountain linnet is distinguished from the common linnet by the greater length of its tail, which gives the bird a more elongated and slender appearance. It is also still further distinguished by the colour of the feathers on its head, which are of a tawny reddish colour, in lieu of the vermilion-red of the common type. This bird is a winter visitor to the southern parts of England; but it often breeds both in the north of England and Scotland. Mr Macgillivray observes of it, in a quotation extracted from Mr Yarrell's "British Birds," that the mountain linnet "is plentiful in the Hebrides, and in winter frequents the corn-yards in large flocks, clinging to the stacks of oats and picking out their seeds. Its flight is rapid and undulated, and it flies in circles over the fields previous to alighting, uttering a soft twitter at intervals. In spring it forsakes its winter haunts, and disperses over the hilly tracks, where it forms its nest on the ground amongst short heath, or on the grassy slopes of craggy spots. The nest is neatly constructed, being composed externally of fine dry grass, fragments of heath, and a little moss; internally of fibrous roots, wool, and hair. The eggs are bluish-white, marked towards the larger end with light brown and purplish red, sometimes with a few blackish dots." (*See* also article FRINGILLIDÆ.)

LINSANG. (*See* DEHENDUNG.)

LION, *li'-on*, (Fr., from Lat. *leo*, *leonis*.)—This animal, erroneously described by the ancients as the king of beasts, belongs to the family of the Felidæ, a genus of the class Mammalia, order Feræ, (rapacious beast,) of which family the lion is the type. The dental formula of the lion may be thus scientifically expressed:—

$$\text{Incisors } \frac{6}{6},\ \text{canines } \frac{1-1}{1-1},\ \text{molars } \frac{4-4}{3-3};\ \text{total } 30.$$

When called into action, these teeth act like the antagonistic blades of a pair of scissors upon the substance submitted to their cutting edges. The canine teeth are very long and large. The feet of the lion, like the rest of the Cat family, exhibit one of the most beautiful conformations of nature. In walking, only the soft parts touch the ground; and hence their tread is noiseless. The lion thus glides along with a stealthy pace until it crouches within proper distance, when it springs with fearful velocity and force upon its unsuspecting prey. Another adjunct of terror with regard to this animal is the fearful roar which it emits at the moment it pounces on its prey; its unhappy victim being deadened, as it were, with fright at the same moment as it feels its enemy's talons and murderous teeth. The other generic characteristics of the animal will be found given under the article FELIDÆ. Formerly only one species of the lion was admitted by zoologists; but of late, as discovery has opened fresh fields for investigation, it would appear that there are several degrees and varieties of this animal. At one time they must have been, from the frequent allusions made to them in Scripture, tolerably abundant in Syria, Palestine, and Egypt; but at the present day they have totally disappeared from those countries. Of all the different varieties which have been observed by naturalists, the African lion (*Leo africanus*) is by far the finest, most powerful, and the most ferocious. Of this there are three different specimens, which may be thus enumerated,—the Barbary lion, from Barbary and North Africa; the Senegal lion, from Senegal and the west of Africa; and, lastly, the Cape lion, from South Africa and the Cape of Good Hope. The general prey of the African lion consists of the larger herbivorous quadrupeds; and there are few of these which it is unable to master. When aroused, lions retreat slowly; and if no cover is near, when they have got to a sufficient distance, they bound away at a prodigious rate. They seldom, if ever, invite conflict with man, always trying to retreat; but when they are shot at, and are wounded, they then turn on their pursuer with fearful ferocity. The following recital, which is taken from a work entitled "Zoological Anecdotes," refers to Mr Cumming's work on hunting in South Africa, and furnishes a tolerably characteristic sketch of the habits of the lion:—"Mr Cumming had shot three rhinoceroses near a fountain, and soon after twilight had died away, he came down to the water to watch for lions. With him was his Hottentot, Kleinboy. 'On reaching the water, I looked towards the carcass of the rhinoceros, and, to my astonishment, I beheld the ground alive with large creatures, as though a troop of zebras were approaching the water to drink. Kleinboy remarked to me that a troop of zebras were standing on the height. I answered, 'Yes;' but I knew very well that zebras would not be capering around the carcass of a rhinoceros. I quickly arranged my blankets, pillow, and guns in the hole, and then lay down to feast my eyes on the interesting sight before me. It was bright moonlight, as clear as I need wish. There were six large lions, about twelve or fifteen hyænas, and from twenty to thirty jackals, feasting on and around the carcasses of the three rhinoceroses. The lions feasted peaceably, but the hyænas and jackals fought over every mouthful, and chased one another round and round the carcasses, growling, laughing, screeching, chattering, and howling, without any intermission. The hyænas did not seem afraid of the lions, although they always gave way before them; for I observed that they followed them in the most disrespectful manner, and stood laughing, one or two on either side, when any lions came after their comrades to examine pieces of skin and bone which they were dragging away." The following account of an attack by one of these man-eaters, as they are termed (for, having once tasted human flesh, they will eat nothing else if it can be obtained), makes the blood run cold. Mr Cumming and his party had, unknown to them, pitched their camp in the proximity of a lion of this description. All had retired to rest, when (says Mr Cumming) "suddenly the appalling and murderous voice of an angry and bloodthirsty lion burst upon my ears within a few yards of us, followed by shrieking of the Hottentots. Again and again the murderous roar of attack was repeated. We heard John and Ruyter shriek, 'The lion, the lion!' still, for a few moments, we thought he was but chasing one of the dogs round the kraal; but the next instant John Stofolus rushed into the midst of us, almost speechless with fear and terror, his eyes bursting from their sockets, and shrieked out, 'The lion! the lion! He has got Hendrick! He dragged him away from the fire beside me! I struck him with the burning brands upon his head; but he wouldn't let go his hold. Hendrick is dead! O God! Hendrick is dead! Let us take fire and seek him.' The rest of my people rushed about shrieking and yelling as if they were mad. I was at once angry with them for their folly, and told them that if they did not stand still and keep quiet, the lion would have another of us, and that very likely there was a troop of them. I ordered the dogs, which were nearly all fast, to be made loose, and the fire to be increased as far as could be. I then shouted Hendrick's name; but all was still. I told my men that Hendrick was dead, and that a regiment of soldiers could not now help him; and hunting my dogs forward, I had everything brought within my cattle kraal, when we lighted our fires and closed the entrance as well as we could. It appeared that when the unfortunate Hendrick rose to drive in the ox, the lion had watched him to his fireside, and he had scarcely lain down when the brute sprang upon him and Ruyter (for both lay under one blanket) with his appalling murderous roar, and roaring as he lay, grappled him with his fearful claws, and kept biting him on the breast and shoulder, all the while feeling for his neck; having got hold of which, he at once dragged him away backwards round the bush into the dense shade. As the lion lay on the unfortunate man, he faintly cried, 'Help me! help me! O God! men, help me!' After which the fearful beast got hold of his neck, and then all was still, except that his comrades heard the bones of his neck cracking between the teeth of the lion." Many more anecdotes of a similar nature will be found in Mr Greenwood's interesting work, "Wild Sports of the World." The colour of the African lion is generally a tawny yellow, like the general class Leo; the only exception being the Cape lion, which is of a more brownish colour. Of Asiatic lions there are three varieties,—the Bengal, the Persian, and the maneless lion of Guzerat. The first of these is smaller in size, with a less expansive mane, and it is usually of a lighter colour than the African. It also does not possess the same degree of courage which distinguishes the latter. The Persian lion is characterised by the pale yellow colour of its fur. The maneless lion of Guzerat (*Leo goojratensis*) is distinguished from the other species of lions by its being nearly destitute of that appendage, the mane, which is such a striking feature of the African and Bengal lions. This variety is found in Guzerat, along the banks of the river Sombermuttee, near Ahmedabad, extending through a large tract of country about forty miles in length. A very excellent sketch of this animal, which we are unable to insert, will be found in the "Transactions of the Zoological Society" for the year 1833. The lion has been hailed by the title of "king of beasts," and "monarch of the forests," and has been considered as the emblem of majesty and might. It is the symbol of the British nation, and is borne on the royal arms. But all the poetic imagery with which it has been surrounded is altogether unlike its real nature, which is characterised by its overwhelming its prey merely by surprise in attack, and its running away, generally, at the slightest display of resistance from man,—sometimes even the sight of man is sufficient to cause the "king of beasts" to take to degrading flight. (*See*, also, articles FELIDÆ and MAMMALIA.)—*Ref.* Baird's *Encyclopædia of the Natural Sciences*; Owen's *Natural History.*

LIP, *lip*, (Sax. *lippa*, Lat. *labium*,) in **Anat.**, constitutes the outer edge or border of the mouth. The lips are formed by muscular fibres, glands, and cellular tissue, covered by mucous membrane. They owe their extremely red colour to the thinness of the covering membrane, and their sensitiveness to an abundant supply of minute nervous fibres. They are not unfrequently affected with cancer. (*See* CANCER.) The lips form part of the organs of speech, and are necessary to the pronunciation of certain letters, which are hence called labials or lip letters.

LITHODOMUS, *lith-od'-ŏm-us*, a genus of bivalve molluscs, popularly called Date Shells. They have the power of boring into stone or shell, and in some unexplained manner force their way completely through the hardest substances.

LIVER, *liv'er*, (Sax. *lifer*, Gr. *hepar*,) in Anat., is the secreting organ or gland by which the bile is formed. It is situated in the right hypochondriac and epigastric regions, below the diaphragm, and is of a reddish-brown colour. Its form is irregular, being convex on the upper surface, irregularly concave below, very thick behind, and very thin in front, and in the adult it generally weighs from three to four pounds. It is divided into two principal lobes, the right and left,—the former of which is by much the larger. They are divided on the upper side by a broad ligament, and below by a considerable depression, or fossa. Between and below these two lobes is a smaller lobe, called lobulus Spigelii. To the left it has the fissure for the lodgment of the ductus venosus; on the right, the fissure for the vena cava. The lobulus caudatus is a tail-like process of the liver, stretching downwards from the middle of the right lobe to the lobulus Spigelii. The liver, like the other viscera of the abdomen, receives an investment from the lining membrane of that cavity,—the peritoneum, which being reflected from it at different points, forms broad bands, connecting the liver with the surrounding parts. An investment of areolar tissue is also spread over the organ, extending into the interior, and forming thin but dense sheaths to the vessels and canals, called the capsule of Glisson. The blood-vessels of the liver are the hepatic artery and veins, and the vena portæ; the lymphatics are numerous, and the nerves are supplied from the pneumogastric and phrenic, and the hepatic flexus. The proper tissue of the liver is composed of a great number of granular bodies, of the size of millet, and called lobules, of a foliated appearance. The liver thus receives two kinds of blood—arterial, by means of the hepatic artery, in small quantity, destined principally for the nourishment of the gland; and venous, by the vena portæ, in much larger quantity, from which the bile is principally formed. The tributary branches, by the junction of which the main trunk of the portal vein is formed, comprise the veins which receive the blood from the stomach and intestinal canal, the spleen, pancreas, and gall-bladder. From these various sources, then, venous blood is poured into the liver by the vena portæ, which divides and subdivides, like an artery, till it reaches the interlobular spaces, forming a freely anastomosing network throughout the organ, and constituting the interlobular veins. From these interlobular veins proceed, on every side, minute capillaries, which form dense networks, that seem to make up nearly the whole substance of the lobules. Through the capillaries the blood passes into *intra*-lobular veins, of which one, with its outspread branches, occupies the centre or axis of each lobule; and these intralobular veins, by successive junction and conflux, make up the trunks of the hepatic veins, by which the blood of the portal vein, after secreting the bile, is carried from the liver. The secretion of bile (*see* BILE,) though the chief and most obvious of the functions of the liver, is not the only one which it has to perform; for recent discoveries have shown that important changes are effected in certain constituents of the blood, in its transit through this gland, whereby they are rendered more fit for their subsequent purposes in the animal economy. From the labours of M. C. Bernard, it appears that the low form of albuminous matter conveyed from the alimentary canal by the blood of the portal vein, requires to be submitted to the influence of the liver before it can be assimilated by the blood. The liver also possesses the remarkable property of forming sugar out of principles in the blood which contain no trace of saccharine or amylaceous matter. The excretory apparatus of the liver consists of the hepatic, common, and cystic ducts, and the gall-bladder. The biliary ducts commence by small twigs in each lobule, and join, forming, where they emerge from the gland, the hepatic duct. This duct, after passing down for a short distance, is joined at an angle by the cystic duct from the gall-bladder. The common duct thus formed is called the ductus communis coledochus, and empties itself into the duodenum. The retention of the materials of the bile in the blood acts like a poison upon the nervous system, and if the suspension of secretion is complete, death soon takes place. Much of the cerebral disturbance accompanying dyspepsia, some forms of which are popularly known as "liver complaint," is doubtless due to deficiency of the biliary secretion, and the non-elimination of certain deleterious constituents. (For diseases of the liver, see BILE, BILIOUS, DYSPEPSIA, HEPATITIS, &c.) — *Ref.* Todd's *Cyclopædia of Anatomy and Physiology;* Carpenter's *Physiology;* Budd's *Treatise on Diseases of the Liver.*

LIZARD. (*See* LACERTINIDÆ.)

LLAMA, or GUANOCO, *la'-ma,* a genus of animals belonging to the class *Mammalia,* order *Ungulata,* family *Bovidæ,* and tribe *Camelina,* The llama bears a strong resemblance to the camel, and may be looked upon as the representative of that animal in the New World, being confined to South America. Their teeth are very similar to those of camels, but their backs are not furnished with humps; their tails are short and hairy, their toes slender, and their soles narrow and separated in front. In Peru, where they are principally found, they live in a wild state, in herds of sometimes one or two hundred. The ancient Peruvians, however, completely subdued and domesticated the llama as a beast of burden; and to them it answered all the purposes of the camel or dromedary of the Old World. In a wild state, the herd keeps a careful look-out, and when disturbed, gallops off with great rapidity. There are two distinct species found in South America,—the *Lama vicugna,* and the *Lama guanacus.* They both inhabit the Peruvian Alps, the Pampus, and the mountains of Chili, extending as far as the Straits of Magalhaens. The former animal, the vicuna, is principally found in the most elevated land and mountains of Bolivia and Chili. This species is quite wild, and hitherto has defeated all attempts of the aborigines to domesticate it; and has an awkward habit of jumping and kicking with its hind legs. The guanaco is the characteristic quadruped of the plains of Patagonia, and is very common over the whole of the temperate parts of South America. They live in herds, but are easily domesticated after being caught. In their habits they resemble a flock of sheep, and, when caught, appear to have no idea of defending themselves. Two other species of llama, which are thoroughly domesticated, are also mentioned by travellers,—the *L. glauca,* which is of a whitish colour, and has long slender legs; and the *L. Pacos,* which is of a blackish hue, and has short legs. The wool of llamas is made into cords and sacks as well as into stuffs for ponchos, &c.; and in Mexico the bones are converted into instruments for weaving the wool. The dung is also used for fuel. The llama is, however, rapidly disappearing, and its place is being supplied by the more useful and profitable European sheep.

LOBE, *lobe,* (Lat. *lobus,*) in Anat., is a term applied to the more or less separate parts of which the glands of the body are composed. Thus we have the lobes of the brain, lungs, liver, &c. Lobe is also applied to that pendent portion of the ear which is more fat and fleshy than any other part.

LOBSTER, *lob'-ster,* (Ang.-Sax.,) (*Homarus vulgaris,*) a crustaceous animal belonging to the order Macroura, and family Astacidæ, When alive, its general colour is a bluish-black, beautifully variegated with paler spots and clouds. Its thorax is smooth, its snout short and serrated, and it has very long antennæ, with two shorter bifid ones between them. The claws and fangs are large, the greater being tuberculated, and the lesser serrated on their anterior edges. It has four pairs of legs; the tail has six joints, and the caudal fin is rounded. The two great claws of the lobster form its instruments of provision and weapons of defence; they open and close like a pair of nippers, and are very strong. The head of the lobster is small, and furnished with two eyes, which are projectile or retractile at will. The mouth resembles that of an insect, opens longitudinally, and is furnished with two teeth for the mastication of its food, and between them is a fleshy substance shaped like a tongue. When the young leave the parent lobsters, they seek the minute crevices of the rocks and other secure places, and in a few weeks they acquire hard, firm shells. Lobsters, like crabs, change their shells every year; previous to this process they appear sick, languid, and restless, and lie torpid and motionless. Three or four days are required before they acquire their new shells, and during that period they are defenceless, and become the prey, not only of fish, but also of such of their own species as are not in a similar condition. While in a soft state, lobsters increase in size; and in comparing the dimensions of an old shell with a new, the latter is found to be one-third larger than the former. When boiled, the lobster becomes red. In a commercial point of view the lobster is perhaps the most important of all the crustaceans, on account of the esteem in which it is held as an article of food. 150,000 are annually sent to Billingsgate market from the coast of Scotland and the Orkney and Lewis Islands; 600,000 annually arrive there from Norway; and it is not uncommon to see 20,000 to 25,000 lobsters in the market in one day. They are principally sent to London during the period between March and August. According to most accounts, they are very stationary in their habits, and differ in colour and appearance in the different places where they are taken. They are caught in pots, similar to those used in the capture of crabs. Lobsters very readily part with their large claws; and, when seized by one of them, the animal gives it up at once. When suddenly alarmed by a peal of thunder, or the report of a cannon, they shoot their claws immediately. Considerable time elapses before the lost member is restored, and attains the size of the old one.

LOCUSTS, LOCUSTIDÆ, *lo'-kusts*, (Lat. *locusta*, a locust,) a family of insects belonging to the order Orthoptera, and containing several genera and many species. Locusts are spread all over the globe, and generally appear in great numbers. The produce of whole countries has been destroyed by them, on account of the rapidity with which they multiply. The species found in Europe are rather small, but some of the exotic varieties are large. Their principal food consists of leguminous plants. During spring and the beginning of summer, they are in their larva state, without wings; but in the latter part of the summer they become perfect insects. Locusts, like many other insects belonging to the order Orthoptera, have the faculty of producing sounds. They produce a harsh, creaking noise, by acting upon their elytra, or wing-covers, with their hind legs. On account of the veins being considerably elevated in the elytra, and the inner edge of their thighs being rugose with spines, the rubbing of the one against the other produces the noise. Of all the species, the migratory locusts, (*Locusta migratoria*,) although a small insect, is one of the most destructive to man. Its powers of destruction are immense, and as they are produced in great numbers, they soon destroy the vegetation where they are born. After consuming all within their reach, they take flight in swarms to some adjoining district. At times the number of locusts is so great that the sky is absolutely darkened during their passing, and the spots where they alight assume the appearance of a barren waste, almost in an instant. These insects appear periodically in several parts of Central Europe, in Egypt, Syria, and almost all the south of Asia, and spread terror and dismay before them. Rewards are offered for the collection of both the eggs and the perfect insects in the south of Europe. It is on record that in 1613, at Marseilles, 20,000 francs were paid for this purpose. A similar plan is adopted in Turkey and in China. A larger species of locust, beautifully coloured, *Locusta crustata*, is common in Southern Africa, and is very destructive at certain seasons. The inhabitants of some countries make use of the large species of locusts as food. They pull off their wings and fry them in butter or oil, or pickle them.

LOGGERHEAD-TURTLE, *log-gur-hed*, a large

marine turtle found in the South Seas. Its scientific name is *Caouana carelta*. It is also called the Casinave and the Rhinoceros Turtle. The shield has at least 15 horny plates, and the breast-bone is strongly keeled. There are no claws. It is a large and fierce reptile, biting furiously when attacked. It lives mostly on molluscs and crustacea.

LOIRE, *lawyre*, name for the fat dormouse, a species which is eatable, and was once in great request among the ancients as a dainty for the table, numbers being cooped up and fattened artificially.

LONGICORNS, *lon'-je-korns*, (Lat. *longus*, long, *cornu*, horn,) an order of coleopterous insects, so called on account of the length of their antennæ, which are generally longer than their bodies, and very seldom shorter. Longicorn insects also possess other distinctive characters. The under part of the first three joints of the tarsi, in all of them, is furnished with a brush; the second and third joints are cordiform; the fourth is deeply bilobate; and at the base of the last there is a little nodule, resembling a joint. The antennæ are either filiform or setaceous; being sometimes simple in both sexes, and sometimes serrate, pectinate, or flabelliform in the males. In some species, the eyes are rounded and entire; in others, slightly emarginate; in the latter case, the thorax is trapezoidal or narrowed anteriorly. In most cases, however, the eyes of the longicorns are reniform, and surround the base of the antennæ. The larvæ of a great number of the longicorns are destitute of feet, or have very minute ones, as a large proportion of them live in the interior of trees or under the bark. The body is soft, whitish, and thickest in the fore part; and the head is squamous, and furnished with strong mandibles. The larger varieties of the longicorns do often great damage to trees, sometimes drilling them in every direction. Some species attack the roots of plants.

LONGISSIMUS DORSI, *lon-jis'-si-mus dor'-si*, (Lat., the longest [muscle] of the back,) in Anat., is a muscle of the back, which rises from the posterior surface of the os sacrum and transverse and oblique processes of the lumbar vertebræ, and is inserted by small double tendons into the posterior and inferior part of all the transverse processes of the vertebræ of the back, sending off also bundles of fibres to all the ribs between their tubercles and angles. Its use is to support the spine, and bend it backwards and to one side.

LONGUS COLLI, *long'-gus kol'-li*, (Lat., the long [muscle] of the neck,) in Anat., is a muscle situated close to the anterior and lateral part of the vertebræ of the neck. It rises from the three superior vertebræ of the back, and is also connected by tendons with the four last vertebræ of the neck, being inserted into the fore part of the second vertebræ of the neck, near its fellow. Its use, when acting singly, is to move the neck to one side; but when both act, they serve to bring the neck directly forwards.

LOPHIUS. (*See* ANGLER-FISH.)

LOPHOBRANCHIATA, an order of fishes in which the gills are composed of little round tufts, the perculum large, and the spectum small. The sea-horse and the pike fishes belong to this order.

LOPHOLAIMUS, *lof-ŏl-ai-ĭm-us*, generic name for the Jophust pigeon of Australia. This bird is notable for the large crest that decorates its head, and for the bold and upright carriage of its body. It is a fruit-eater, but its flesh is coarse and dry, and is seldom eaten.

Lophophorus. (*See* Pheasant, Peyan.)

Loris, *law'-ris*, a group of nocturnal quadrumana, having the muzzle long and sharp, the eyes very large, and no tail. They inhabit Ceylon.

Lories, *lo'-ris*, a group of birds of the parrot family—the *Psittacus Lorius* of Linnæus; sub-family Lorianæ. The characteristics are, —bill only slightly curved; the margin of the upper mandibles sinuated; the notch obsolete; lower mandible slender, conic, much longer than high; the gonys (typically) straight.

Lota. (*See* Ling.)

Louse, *lowse*, (Sax. *lus*,) a term applied to certain disagreeable and unseemly parasitic insects. They are distinguished by having six feet formed for walking, a mouth furnished with a proboscis, antennæ as long as the thorax, with the abdomen, which is formed of several segments, depressed. Many, if not all mammals, and perhaps all species of birds, are infested with lice; and it would appear that each species of mammal and bird has its own peculiar species of louse, and sometimes even two or three distinct species. They breed very rapidly, several generations occurring in a short period. Their increase seems to be favoured by certain circumstances,—as infancy, and that condition of the system which gives rise to *phthiriasis*, or the lousy disease. The human species is subject to the attacks of several species; among which are the *Pediculus humani corporis*, or body louse, principally occurring in adults who are dirty in their personal habits; and the *P. humani capitis*, or common louse, most frequent in children. The best antidote against these disgusting insects is cleanliness. Although of rare occurrence now, the lousy disease was not unfrequent among the ancients. Herod, Antiochus, Callisthenes, Sylla, and many others, are supposed to have perished from this complaint. The genus Phthirus differs from the pediculus in having the body wide and rounded, the thorax very short and confounded with the body; the anterior feet are simple, and the two hinder pairs are didactyle. Among some nations, the louse is looked upon as a gastronomic luxury, and at one time it was considerably used in medicine. (*See* Epizoa.)

Loxia. (*See* Crossbill.)

Loxodonta, *loks-o-don'-ta*, generic name for the African elephant.

Lucanus. (*See* Stag-beetle.)

Lucioperca. (*See* Perch, Giant.)

Lugworm, *lug'-wurm*, a well-known annelid inhabiting our own coasts, and found in the muddy sand. Fishermen use it much for bait. The breathing organs are thirteen pairs of bright scarlet tufts which are set upon the back, and the sides are furnished with stiff bristles, which enable the creature to force itself through the sand. Its scientific name is *Anerisala piscatorum*. The creature does not merely lie in the loose sand, but cements the particles together so as to form a slight tube which it can traverse, and though this tube will not bear removal, it is strong enough to withstand the wash of the waves.

Lumbar, *lum'-bar*, (Lat. *lumbus*, the loin,) in Anat., denotes of or belonging to the loins; as, lumbar region, &c. (*See* Loins.)

Lumbricus. (*See* Earthworm.)

Lump Fish, an acanthopterygian fish belonging to the family of the Discoboli, (*Cyclopteros lumpus*,) sometimes called the Coch. Paidle. The ventral fins are modified into a sucker by means of which the fish can attach itself to rocks.

Lungs, *lungs*, (Sax. *lungen*,) in Anat., are two large conical bodies placed one in each of the lateral cavities of the chest, and separated from each other by the heart and large vessels and by two layers of the pleura, which form the mediastinum, or median partition. They occupy by far the larger portion of the cavity of the chest, and during life accurately adapt themselves to its varying dimensions. Each lung is invested by an exceedingly delicate serous membrane, termed the pleura. Each pleura forms an independent shut sac quite distinct from the other, enclosing the corresponding lung as far as its root, and then reflected back upon the inner surface of the thorax. The portion investing the surface of the lung is called the *pleura pulmonalis*, while that which lines the inner surface of the chest is called the *pleura costalis*. The root is that part of the lung which is connected to the heart and the trachea; being formed by the bronchial tube, the pulmonary artery and veins, the bronchial arteries and veins, &c., all of which are enclosed by a reflection of the pleura. Each lung is of a conical shape, with a broad concave base resting upon the convex surface of the diaphragm. The apex forms a blunted point, which extends into the root of the neck about an inch above the level of the first rib. The outer or thoracic surface is smooth, convex, and of considerable extent, corresponding to the form of the cavity of the chest, and of greater depth behind than in front. The inner surface is flattened or concave, presenting in front a depression corresponding to the convex surface of the pericardium, and behind a deep fissure, (the *hilum pulmonis*), which gives attachment to the root of the lung. The posterior border is obtuse or rounded, and is received into the deep groove formed by the ribs at the side of the vertebral column. The anterior border is thin and sharp, and overlaps the front of the pericardium. The anterior portion of the right lung corresponds to the medium line of the sternum, and is in contact with its fellow, the pleuræ being interposed, as low as the fourth costal cartilage, below which they are separated by an irregularly-shaped interval formed at the expense of the left lung. Each lung is divided into two lobes, a lower and an upper, by a long and deep fissure, which commences upon the upper portion of the posterior border of the lung, about three inches from the apex, and extends obliquely downwards and forwards to the lower part of the anterior border, penetrating nearly to the root of the organ. The upper lobe is smaller than the lower, and is conical, with an oblique base, while the lower lobe is more or less quadrilateral. In the right lung, the upper lobe is partially divided by a second and shorter fissure, extending from the middle of the principal fissure forwards and upwards to the anterior margin of the organ, and marking off a small triangular portion, called the middle lobe. The right lung has thus three lobes, and is larger and broader than the left. The weight of the lungs varies much, according to the quantity of blood, mucus, or serous fluid that they may contain; but in general they are found to be between thirty-six and forty-two ounces,—the right lung being about two ounces heavier than the left. The lungs are heavier in the male than in the female, being in the former in proportion to the body as one to thirty-seven, in the latter as one to forty-three. The substance of the lung is of a light, porous, spongy texture, and when healthy, is buoyant in water; but in the fœtus, before respiration has taken place, and also in cases of congestion or consolidation from disease, the entire lungs, or portions of them, will sink in that fluid. The specific gravity of a healthy lung after death varies from 345 to 746, water being 1000. At birth the lungs are of a pinkish-white colour; but as life advances they become darker, and are mottled or variegated with patches of a dark slate-colour, assuming at length a dark black colour. The pulmonary tissue is endowed with great elasticity, in consequence of which the lungs collapse by atmospheric pressure, when the thorax is opened, to about one-third of their bulk. The lungs are composed of an external or serous coat, a subserous areolar tissue, and the pulmonary substance. The serous coat is derived from the pleura, as already mentioned, beneath which is a thin layer of subserous areolar membrane, containing a large proportion of elastic fibres. It invests the entire surface of the lung, and extends inwards between the lobules. The substance of the lung itself is composed of numerous small lobules, which, although closely connected together by an interlobular areolar tissue, are quite distinct from one another, and are easily separable in the fœtus. These lobules are of various sizes, those on the surface being large and of a pyramidal form, with the base turned toward the surface; those in the interior being smaller, and of various forms. Each lobule may be regarded as a lung in miniature, the same elements entering into its composition as go to form the lung itself. Each is composed of one of the ramifications of the bronchial tube and its terminal air-cells, of the ramifications of the pulmonary and bronchial vessels, lymphatics and nerves; all being connected together by areolar fibrous tissue. Each bronchus, on entering the substance of the lung, divides and subdivides dichotomously throughout the entire organ. Sometimes three branches arise together; and occasionally small lateral branches are given off from the sides of a main trunk. Each of the smaller divisions of the bronchi enters a pulmonary lobule, and again subdividing ultimately terminates in the intercellular passages and air-cells, of which the lobule is composed. After entering the substance of the lobules, each lobular bronchial tube is said to divide and subdivide from four to nine times, according to the size of the lobule, diminishing in size until they attain a diameter of 1-50th to 1-30th of an inch, when they become changed in structure, lose their cylindrical form, and are continued onwards as irregular intercellular passages through the substance of the lobule. Within the lungs, the bronchial tubes are not flattened behind like the bronchi and trachea without, but form completely circular tubes. The air-cells are small polyhedral alveolar recesses, separated from each other by thin septa, and communicating freely with the intercellular passages. They vary from 1-200th to 1-70th of an inch in diameter, and are larger on the surface than in the interior. The pulmonary artery conveys the venous blood to the lungs. It divides and subdivides into branches, which accompany the bronchial tubes, and terminates in a dense capillary network upon the walls of the intercellular passages and nerves. From this network, the radicles of the pulmonary veins arise, and, coalescing into large branches, at length accompany the arteries and return the blood, purified by its passage, through the capillaries to the heart. In their course through the lung, the branches of the pulmonary artery are usually found above and in front of a bronchial tube, and the vein below. The pulmonary arteries and veins differ from the same vessels in other parts of the body, inasmuch as the former convey dark blood, the latter red blood. The pulmonary veins are also destitute of valves. The bronchial arteries and veins are much smaller than the pulmonary vessels, and are designed for the nourishment of the substance of the lungs. The lungs are supplied with nerves from the pulmonary plexuses, formed chiefly by the par vagum, together with filaments from the sympathetic. The absorbents are deep-seated and superficial. They pass to the bronchial glands at the roots of the lungs, and then proceed partly to the thoracic duct on the left side, and partly to a corresponding vessel on the right. The lungs are the great organs of respiration. The air passes through the bronchial tubes until it reaches the minute air-cells, on the walls of which the blood circulates in a network of capillaries in such a way that it is brought into immediate connexion with the atmosperic air, which is drawn in by each inspiration. In the act of breathing, the capacity of the chest is increased by the action of certain muscles, when the air rushes in to fill the vacuum, and expansion of the lungs takes place; and then, the muscular movement ceasing, the ribs by their weight and elasticity contract and force out the air. From fifteen to twenty-two is the average number of respirations in a minute; but this number may be very greatly increased by excitement, exercise, or disease. The lobules are not all distended with air in ordinary inspiration, nor by the most powerful efforts that can be made. Those of the upper parts of the lungs seem to be most filled, and are most constantly in action. The average quantity of air contained in the lungs is estimated at about 200 cubic inches. In each ordinary act of inspiration, or expiration, a change of from twenty to thirty cubic inches is supposed to take place. The lungs, from their highly-organised structure and their incessant exercise, are, perhaps, more liable to disease than any other part of the body. The diseases to which they are mostly liable are, in their first stages at least, of an inflammatory character, and are mostly produced by exposure to damp and cold, sudden atmospheric changes and transitions of temperature, want of proper nourishment, &c. The state of the lungs can now be ascertained with tolerable certainty by means of auscultation.—*Ref.* Quain's *Anatomy*, by Sharpey; Gray's *Anatomy*.

Lurcher, *lur'-tsher*, a sort of hunting-dog, resembling a mongrel greyhound, with pricked ears, a shaggy coat, and generally of a yellowish-white colour. It runs very swiftly, so that, if it get between the burrows and the rabbits, it seldom misses taking them; in hunting, this is its usual practice. The lurcher is much used by poachers, because it can be easily trained to hunt silently.

LUSINIA. (*See* NIGHTINGALE.)

LUTH, *looth.* (*See* TURTLES.)

LUTRA. (*See* OTTER.)

LUWACK. (*See* PARADOXURUS.)

LYCÆNIDÆ, *li-seen'-ĭd-ee,* a family of small butterflies, in which the fore-legs are used for walking, and the last joint of the palpi is minute and naked. They are mostly of light colour. The well-known hair-streak and coffee butterflies belong to this family.

LYCOSA, *li-kō'-sah,* a genus of arachnida, commonly called wolf spiders, because they use no webs, hunt their prey on the ground. The common black ground spider belongs to this genus.

LYMPH, *limf,* (Lat. *lympha,* water,) in Anat., is a thin, transparent, colourless fluid, which is found in the lymphatic or absorbent vessels abundantly distributed over the body. (*See* LYMPHATICS.) Its taste is saline, and it has a faint, scarcely perceptible smell. When examined with the microscope, it is seen to consist of a clear liquid, with corpuscles floating in it, which agree entirely with the pale corpuscles of the blood. The liquid part bears a strong resemblance in its physical and chemical constitution to the plasma of the blood. The constituent parts of lymph are as follows:—

Water	96·926
Fibrin	·520
Albumen	·434
Ozmazome	·312
Fatty matters	·264
Salts	1·544
	100·

Lymph is a nutritious fluid, and not excrementitious, as was maintained by Hewson and Hunter.

LYMPHATICS, *lim-făt'-iks,* in Anat., is the name given to a class of vessels in the human body, from their containing lymph. They are also called absorbents, from the property they possess of absorbing certain materials for the replenishing of the blood, and conveying them into the circulation. The lymphatics are found in all animals which have a lacteal system, the two forming one set of vessels; and, indeed, under the head of lymphatics, in works on anatomy, are generally included the lacteals. The lacteals differ from the lymphatics proper only in containing a milk-like fluid—the chyle, which they take up in the intestines during the process of digestion, and convey into the blood through the thoracic duct. The lymphatics are exceedingly delicate vessels, their coats being so transparent that their fluid contents are readily seen through them. They are found in nearly all the textures and organs of the body which receive blood, with the exception of the substance of the brain and spinal cord. In the different regions of the body, and in the several internal viscera, they are arranged into a superficial and a deep set—the former running immediately beneath the skin, or under the membranous coats enveloping organs internal; the latter usually accompanying the deep-seated blood-vessels. The origin of the lymphatics may be either superficial or deep, and most commonly is in the form of networks or plexuses, out of which single vessels emerge at various points, and proceed directly to lymphatic glands, or to join larger lympathic trunks. The fluids imbibed by these plexuses must pass into them by transudation. The lymphatics of any part or organ exceed in number the veins, but in size they are much smaller. They are interrupted at intervals by constrictions, which give to them a knotted or beaded appearance; and these constrictions correspond to the presence of valves in their interior. Like the veins and arteries, the lymphatics are composed of three coats—an internal, middle, and external. The lymphatic, or absorbent glands, named also conglobate glands, are small solid bodies, situated in the course of the lymphatic and lacteal vessels, and through which their contents pass in their course towards their union with the blood. A lymphatic vessel may pass through two, three, or more of these bodies in its course, while, on the other hand, there are some which reach the thoracic duct without encountering any. Their size is very various, some being not much bigger than a hemp-seed, others as large or larger than a kidney-bean. They are collected in numbers along the course of the great vessels of the neck, also in the thorax and abdomen, especially in the mesentery and alongside the aorta, vena cava inferior, and iliac vessels; also in the axilla and groin, and on the popliteal vessels. A lymphatic or lacteal, previous to entering a gland, divides into several small branches, which are named afferent vessels. As they enter, their external coat becomes continuous with the capsule of the gland, and the vessels, much thinned, divide and subdivide while pursuing a tortuous course, and, finally anastomosing, form a plexus. The vessels composing this plexus unite to form two or more efferent vessels, which, on emerging from the gland, are again invested with their external coat. Capillary vessels are abundantly distributed on the walls of the lymphatics in the glands. The absorbent system discharges its contents into the veins at two points—namely, at the junction of the subclavian and internal jugular veins of the left side by the thoracic duct, and in the corresponding part of the veins of the right side by the right lymphatic trunk. The openings are guarded by valves.—*Ref.* Quain's *Anatomy,* by Sharpey and Ellis.

LYNX, *links,* (Lat.,) a general name applied to the short-tailed Felidæ. Under this head several species were formerly confounded by Linnæus. *Lynx,* or *Chaus servalinos,* the largest and most beautiful, is found in Asia and Europe. *Lyncus Europæus,* the European lynx, has become rare, and is only found in the Pyrenees and part of the Apennines. In length this animal is about three feet, and is very destructive to the smaller quadrupeds. Among the ancients it was celebrated as having been harnessed to the car of Bacchus when he made his Indian conquest. Great quickness of sight was also attributed to it, and it was supposed that its urine was converted into a precious stone. The skin of the male is spotted, and is more valuable in winter than in summer. Another species of lynx is the caracal, which is slightly larger than a fox. It derives its name from the black colour of its ears, *caracal* being a Turkish word signifying black. In North America there are several species of these animals, the best known of which is the northern or Canada lynx, *Lyncus Canadensus*, distinguished by the name of *loup-cervier* and *le chat* among the French Canadians. In the region round Hudson's Bay it is found in great abundance, about seven to nine thousand skins being annually exported. Although a timid creature, and incapable of attacking the larger quadrupeds, it is very destructive to rabbits and hares, on which it chiefly preys. When brought to bay by a hunter, it makes but a slight resistance; for, though it spits and erects the hair on its back like a cat, it is easily killed by a blow with a slight stick. In appearance it is clumsy and awkward, on account of its large paws, slender loins, and long but thick hind legs, with large buttocks, scarcely relieved by a short thick tail. It moves in straightforward bounds, with the back a little arched, and lighting on all four feet at once. It is not swift on land, but swims well. Its flesh is eaten, and somewhat resembles the rabbit in flavour. It breeds once a year, and has two young ones at a time.

Lyra, *lī'-rā*, (Lat., a lyre,) in Anat., is the name given to a portion of the brain, between the posterior crura of the fornix of the cerebrum, and marked with prominent medullary fibres, so as to give it the appearance of a lyre.

Lyre Bird, *liar*, (*menura superba,*) a splendid bird of New South Wales, allied to the wren, but being as large as a fowl, and having a beautiful tail, which when spread exactly resembles an ancient lyre, the outer feathers forming the frame, and the central feathers representing the strings. It is extremely shy, and when alarmed, drops into the thickest bush, through which it quietly steals away and so escapes, its speed of foot being at least equal to that of our pheasant. The colonists sometimes call it the pheasant. Two species of Lyre bird are known.

Lyrie, *li-ree'*, an acanthopterygious fish, allied to the Gurnards, (*agonus cataphractus.*) Its body is covered with armour-like plates, disposed in eight rows, and the head and shoulders are armed with sharp spines. It is sometimes called by other names, such as the Pogge, the Noble, the Sea Poacher, and the Armed Bullhead.

M.

Macaw, *mă-kau'*, (*Macrocercus,*) a bird belonging to the family Psittacidæ, or Parrot tribe, and distinguished from other Scansores (the class of the family, so named from their being climbers) by reason of their having their cheeks destitute of feathers, and their tail-feathers being long. The macaws are natives of South America, where they were first discovered. The scarlet macaw—*Ara* (*macrocercus*) *Macao*—is perhaps the most splendid, as well as the largest, species of the entire parrot family. Some of them measure thirty-six inches and more from the tip of the bill to the extremity of the tail, and their plumage is a bright scarlet, relieved with different shadings of blue, yellow, and green. The great green macaw—*Ara* (*macrocercus*) *militaris*—is a native of the Andes, where it is often found at an elevation of 3000 feet from the sea. In former times this bird used to be presented, as an inestimable gift, by the Indians to their Incas, who valued the macaw extremely. It is extremely gregarious and mischievous, by reason of its predatory nature, as it commits great damage upon plantations and gardens, which it plunders right and left. The characteristics of the macaw are the same as the rest of the Psittacidæ, and will be found given under the article Parrot Family.

Mackerel, *măk'-e-rel*, (Du. *mackreel*, from Lat. *maculatus*, spotted,) a member of the Scomberidæ, a family of acanthopterygious fishes, and known by the scientific appellation of *Scomber scomber*, according to the Linnæan system. The generic characters of the mackerel are as follows:—Scales on the body small and smooth; vertical fins not bearing scales; two dorsal fins widely separated; some of the posterior rays of the second dorsal and the anal fin free, forming finlets; sides of the tail slightly carinated; one row of small conical teeth in each jaw; the parts of the gill-covers without denticulations or spines; and, lastly, the branchiostegous rays seven in number. Its usual length varies between twelve and sixteen inches; but it is occasionally found in northern seas of even greater size. The nose is pointed, and the under jaw is the longest. The colour of the back above the lateral line is a fine green, traced with rich blue, and marked with broad dark descending lines. It is said that the males have these dark transverse bands nearly straight, while the females have them beautifully undulated. The sides and under surface are of a silver-colour, traced with brilliant golden tints; altogether, the mackerel is one of the most beautiful of fishes. It was supposed, originally, to be a fish of passage; but there is no doubt that this assertion is untrue, as it is caught nearly the whole year round off the Cornish coast. As an article of food, the mackerel is in great request, and those taken in May and June are said to be superior to those caught later in the year. The fishery is very extensive, and the returns they bring in to the different boats engaged in the trade are something wonderful. The most common mode of fishing is by drift-nets, and the method is thus described by Mr Yarrell:—"The drift-net is twenty feet deep by one hundred and twenty feet long, well corked at the top, but without lead at the bottom. They are made of small fine twine, which is tanned of a reddish-brown colour to preserve it from the action of the sea-water; and it is thereby rendered much more durable. The size of the mesh is about two and a half inches, or rather larger. Twelve, fifteen, or sometimes eighteen of these nets are attached lengthwise by tying along a thick rope, called the drift-rope, and at the ends of each net, to each other. When arranged for depositing in the sea, a large buoy attached to the end of the drift-rope is thrown overboard, the vessel is put before the wind, and as she sails along, the rope, with the nets thus attached, is passed over the stern into the water till the whole of the nets are run out. The net thus deposited hangs suspended in the water perpendicularly, twenty feet deep from the drift-rope, and extending from three quarters of a mile to a mile, and even a mile and a half, depending on the number of nets belonging to the party or company engaged in fishing together. When the whole of the nets are thus handed out, the drift-rope is shifted from the stern to the bow of the boat, and she rides by it as if at anchor. The benefit gained by the boats hanging at the end of the drift-rope is, that the net is kept strained in a straight line, which, without this pull upon it, would not be the case. The nets are shot in the evening, and sometimes hauled once during the night, or allowed to remain in the water until the morning. The fish roving in the dark through the water hang in the meshes of the net, which are large enough to admit them beyond the gill covers and pectoral fins, but not large enough to allow the thickest part of the body to pass through. The nets are thus hauled in :—a capstan on deck is manned, and the drift-rope attached to it; one man stands forward to untie the upper edge of each net from the drift-rope, while others hand in the net with the fish on one side of the vessel, the other being devoted to hauling in the drift-rope. The whole of the net in, and the fish secured, the vessel runs back into harbour, or deposits her cargo on board some swifter boat in company, which carries it to the nearest market." The mackerel is also taken by line-fishing, one of the best baits being a small tapering piece of red cloth, which it eagerly bites at. The horse mackerel, or scad, (*Trachurus trachurus,*) is not a true mackerel, but is allied to the king and rudder fishes.

MACRODIPTERYX, *mak-ro-dip'-tĕr-rix,* a generic name for the Leona Nightjar, (*Macrodipteryx longipennis.*) This bird is a native of Western Africa, and is remarkable for a pair of very long feathers which rise from the wing covert, and are only webbed at the tips, the greater part of the shaft being bare. The colour of the bird is brown, spotted with red and black.

MACROPIDÆ, *mak-ro'-pid-ee,* a family of marsupial mammals, in which the hind feet are very much larger than those of the fore-limbs, and have four toes, the two inner being united as far as the small claws. They have six incisors above, and two below, projecting almost horizontally from the jaw. The kangaroos, bettays, &c., belong to this family.

MADOQUA, *mad-oh'-qua,* a very tiny antelope of Abyssinia, (*Reotiagus saltiana,*) barely fourteen inches in height, and with legs scarcely thicker than pipe stems. It was discovered by Bruce.

MADREPORE, *măd'-re pore,* a term first employed by Imperati to designate a genus of coral-building animals, in which the calcareous axis has its whole surface beset with small lamellate and stellate depressions. Etymologically, the word is a compound of the French *madré,* spotted, and the Latin *porus,* a pore. The genus was adopted by Linnæus, who ranked it among his *Vermes Zoophita,* and characterised it as follows :—"Animal resembling a medusa; *coral* with lamellate star-shaped cavities."

MÆANDRINA. (*See* BRAIN STONE.)

MAGGOT, *măg'-got,* (W. *magrod*) in general language, a term used to designate the larvæ of dipterous, hymenopterous, and some coleopterous insects. (*See* INSECT-TRANSFORMATIONS.)

MAGOT, *Mag'-oh,* a variety which belongs to the genus Macacus, (*Macacus junnus,*) and is sometimes known by the name of Barbary ape. It is a sociable creature and lives in large flocks, and on account of its numbers is often captured when young, and sent to Europe, where it is taught many tricks. This is the monkey which is found on the rock of Gibraltar, and which, though once plentiful, will soon be extinct.

MAGPIE, *măg'-pie,* (*Pica caudata,*) a bird belonging to the family Corvidæ, whose generic characters are as follows :—Beak strong, compressed laterally, slightly arched and hooked at the tip; nostrils basal, covered with short stiff feathers, and directed forwards; wings short and round, the first quill-feather being very short, and the fourth or fifth the longest in the wing; tarsus longer than the middle toe; tail long and graduated. The magpie can be well distinguished as one of our handsomest native birds; but with a handsome exterior, yet, on account of its thieving habits, it has a most suspicious character. With regard to its appearance, the beak is black, the irides hazel; the head, neck, and upper tail-coverts jet-black; the scapulars pure white; the wing-coverts and tertials of a fine shining blue; the primaries black, with an elongate patch of pure white on the inner web of each of the first ten feathers; the tail graduated, the outside feather on each side not exceeding five inches in length, while the inner one extends eleven inches, and is of a beautiful iridescent colour; blue and purple near the end, and green from thence to the base. The chin and throat of the bird are black, the shaft of some of the feathers shining grayish white; the upper part of the breast black, while the lower part of the same, the belly, sides, and flanks are of a pure white colour; finally, the thighs, legs, toes, and claws, are uniformly black.—(*Yarrell.*) The male magpie is generally eighteen inches in length, while the female is slightly smaller. It feeds on both animal and vegetable substances, destroys great numbers of grubs and slugs in pasture land, and performs a very friendly office to sheep and oxen, by getting on their backs and freeing their wool and hides from troublesome vermin. It is a social, and yet not a gregarious bird, and has always been an object of superstition to the vulgar. Magpies, to refer once more to Mr Yarrell's excellent work, generally continue in pairs all the year round. They build in high trees, sometimes in a lofty hedge, and occasionally in a low but thick bush, returning to the same nest for many years in succession. The nest is well constructed for security against enemies; it is of an oval shape, and large, framed on the outside with sharp thorny sticks, strongly interwoven, and forming a dome over the top, the inside being plastered with mud and lined with dry grass. One small aperture is left on the side, just large enough to admit the parent bird, who generally sits with her head to the hole, ready to quit the nest on the slightest alarm. The magpie breeds early in spring, producing six or seven eggs of a pale bluish-white colour, spotted all over with ash-colour and two shades of greenish brown; the length of each egg being about one inch and four lines and a half, while the breadth is about an inch. The magpie is one of the most destructive birds under the sun, as Montagu observes, it "is governed by self-interest, it is a great enemy to the husbandman and the preserver of game, but has cunning enough to evade their pursuit. No animal food comes amiss to its carnivorous appetite; young poultry, eggs, young lambs, and even weakly sheep, it will attempt to destroy by first plucking out their eyes; the young of hares, rabbits, and feathered game, share the same fate; fish, carrion, insects, and fruit, and lastly grain, when nothing else can be got. It is an artful, noisy bird, proclaiming aloud any apparent danger, and thereby gives notice to its associates. Neither the fox, or other wild animal, can appear without being observed and hunted; even the fowler is frequently spoiled of his sport; for all other birds seem to know the alarming chatter of the magpie."—*Ref.* Yarrell's *British Birds.*

MALACOLOGY, *măl-a-kol'-o-je,* (Gr. *malakos,* soft, and *logos,* a discourse,) a name applied by some naturalists to the study of conchology, which will be found treated under MOLLUSCA.

MALACOPTERYGIANS, *măl-ă-kop-ter-ij'-e-ănz,* (Gr. *malakos,* soft; *pterugion,* fin,) a term applied in ichthyology to such fishes as have the rays of their fins bony, although not pointed or sharp at the extremities like those of the class termed acanthropterygious fishes.

MALLARD. (*See* DUCK, WILD.)

MALLEUS, *măl'-le-us,* in Anat., is a term applied to one of the bones of the ear, from its resemblance to a mallet. (*See* EAR.) Also a genus of bivalve mollusks, of which the Hammer Shell is a well-known example.

MAMMALIA, *măm-mai'-le-ă,* (from Lat. *mammæ,* the breasts.) This important class in Zoology, which has been placed by Linnæus at the head of the vertebrated series in the animal kingdom, includes all such animals as are provided with organs for suckling their young. Even excluding man, who necessarily belongs to the class, we find amongst the *mammalia* the greatest number of faculties, the most delicate sensations, the most varied action, and an extraordinary aggregate of properties for the production of intelligence; there is every reason, therefore, for Linnæus having classed the mammalia as first amongst animals. They are most fruitful in resources, least subject to mere instinct, and, finally, most susceptible of progressive improvement. With but a moderate amount of respiration, they are generally intended for locomotion by walking with strength and continuity; and hence all the articulations of their skeletons have the forms very exact; thereby determining, with unvaried precision, the nature of their movements. Some fly through the air by means of membranes affixed to their limbs, although typically adapted for walking on the earth; while others have the extremities so short that they move with ease only in the water; both of these exceptions retain, however, in all other respects, as a rule, the general characteristics of their class. It may be here stated that all mammalia are endowed with warm blood, which results from the great development of their respiratory apparatus; the heart being double and containing four cavities; that is to say, an auricle and ventricle on the right side, and the same on the left. The circulation is carried on in the following manner. The veinous blood passes through the cavities on the right side and is distributed through the lungs, where it combines with the oxygen or vivifying portion of the air; it is then conveyed by the pulmonary veins to the left auricle, from whence it flows into the ventricle, and is propelled through the arterial system. (*See* HEART.) The females suckle their young with milk secreted in breasts or *mammæ,* and are viviparous, or ovo-viviparous; they are consequently placental or implacental; the placental including the higher order of mammals, from man to the last true rodent, and the implacental composing the marsupialia and monotremata. Both of these divisions have the upper jaw fixed to the skull, and the lower is formed of but two pieces only, and is articulated to the temporal bone. The neck (to pursue our investigation) is composed of seven vertebræ; but in different descriptions of animals some of these bones are either more or less in number; the anterior ribs are affixed to the sternum, or breastbone, by cartilaginous processes. The anterior extremities of these commence with a shoulder-blade which is not articulated but rests between the muscles, and often, indeed, leans on the sternum by means of the clavicle on each side. This is continued by an arm, forearm, and hand. The latter is formed of two rows of bones, called the *carpus,* a third row, called the *metacarpus,* and fingers, each consisting of two or three joints. With the exception of the cetacea, or whale family, all mammalia have the pelvis attached to the spine; the pubes forming the anterior, and the ilia, ischia, sacrum, and coccyx, the lateral or posterior parts. At the point where the first three mentioned bones unite, on each side, is the articulation of the femur, or thigh-bone, to which are attached the leg-bones, tibia, and fibula, which are in most cases distinct; and are succeeded by those composing the foot, which correspond to the bones of the hand; namely, a tarsus, metatarsus, and toes. In different orders and genera of animals, the extremities vary considerably; in some, those of the fore parts are considerably lengthened, so as to form the supporters of a wing,—as in bats; in others, they are shortened, as is evinced in the jerboa and kangaroo; while in both of these last-mentioned varieties the posterior extremities are enlarged in the apparently greatest disproportion. The cetacea and similar animals, which have been briefly alluded to, have no pelvis whatever; their hinder extremities are likewise wanting; they are, however, supplied, instead of these, at the end of the spine or vertebral column, with cartilaginous bodies forming a kind of feet, or the flukes of the tail, which, in this species, is always horizontally placed. The fore-foot (*metatarsus*) usually counts as many bones as there are toes present. The metatarsus in the ruminant and solidungulate animals is conformable to the metacarpus. In the genus Dipus (the jerboa), amongst the rodents, the three middle matatarsal bones unite, so as to form a single bone, which terminates below in three processes, to which the three large toes are connected, and which thus resembles the principal bone at the root of the foot in birds. The digits of the foot in the ruminants, the solidungulates, and commonly, also, in the pachyderms, correspond in number and form to those of the hand. Such also is the case in most carnivorous animals, although in the genera *Felis* and *Canis* the thumb (pollex) of the hind foot is not developed, of which a trace only is observed in the fore foot. In the monkeys the other digits are longer than in the human foot. The head is, in all mammalia, articulated by two condyles upon their atlas or first vertebra: as the seat of intelligence, it has excited the greatest interest in all ages; and it has been remarked, that the approach to reason observed in animals bore some relation to the size and configuration of the head. The brain is the centre or origin of the nervous system, and will be found fully described under an article bearing that name. (*See* Ear and Eye.) The tongue of mammals is always fleshy, and is attached to a bone termed the *os hyoides*, which is composed of several pieces, and suspended to the cranium by ligaments. The lungs are two in number, and are divided into lobes, which are composed of an immense quantity of small cells; they are suspended without adhesion in a cavity formed by the ribs and diaphragm, and lined by the pleura. The skin of mammalia is, as a rule, usually covered with hair. Some exceptions, however, have horny plates, as the tribe Mania, or bony plates, as the armadilloes (the genus Dasypus); and some, such as the hedgehog, porcupine, and taurec, have spines. The sense of touch is variously developed in the extremities of the limbs in the different species according as the feet move only for progression, for standing, or for seizing alone. In the apes, which appear to be in this respect one of the most privileged, the hand is much less adapted for feeling than in man, who, in his erect position, can move and apply his fore limbs for the sense of touch more easily. The whiskers which are attached to the lips serve also, like the fleshy appendages attached to the jaws of some fishes, to give warning of external obstacles, on account of branches from the fifth pair of nerves being attached to their roots. The motions of mammals consist principally in progressing. Some are able to spring to great heights; others, again, are formed for swimming. In the cetaceans, or whales, swimming is the sole means of motion. Other mammals are able to fly, as was stated before, by means of a membranous substance below the elongated fingers of the four limbs; like the bats, for instance. With regard to the physical distribution of this class of animals much might be said. Some reside entirely in the sea, as the cetaceans and most of the seals. (*See* Seal Family.) Although some species, especially of the animals last named, live in fresh water, many varieties of the genus Sorex, the otters, beavers, and the duck-mole, reside in lakes and rivers. Others, again, live under ground, as the family Talpa and Bathyergus. The greater part, however, live on land,—some on high mountain tops; as the antelope, ibex, &c.; others on trees, as the apes, squirrels, and monkeys; and some resort, by flying and flapping in part, even to the air (the Cheiroptera.) This difference of resort is naturally in relation with the general bodily form of the animal, and the constitution of its various parts, especially of the organs of motion and sense. In the geographic distribution of the mammalia, it may be as well stated that the numbers of its various classes increase from the pole to the equator,—as well the various classes as the sub-genera; although the cetaceans and seals must be excepted from the rule. There are species in the north polar regions, to quote the remarks made use of in Van der Hoeven's "Handbook of Zoology," common to the old and new world; as *Canis lagopus, Ursus maritimus,* and *Cervus tarandus;* without the polar circle, also, some species are found in the northern countries of both hemispheres, as *Mustela Martis, Mustela erminea,* and *Castor Fiber* (some writers, indeed, maintain that the beaver of America is specifically different from that of the old world). In the temperate parts of North America, almost all the species are such as do not appear in the eastern hemisphere; while in South America no single species is found which also lives in the old world,—nay, even the genera differ for the most part from those of the old world. South American genera, of which no species in the old world are hitherto known, are the following,—*Dicotyles, Auchenia, Dasypus, Myrmecophega, Bradypus, Cavia, Loncheres, Nasua,* the genera of the bat tribe; *Glossophaga, Phyllostoma, Molossus, Noctilio,* and many genera of Quadrumanes; namely *Callithrix, Ateles, Mycetes, Pithecia,* and *Hapale.* *Procyon* is peculiar to the new world in the northern and southern hemispheres. *Fiber* is an animal form of North America. Other genera are peculiar to the eastern hemisphere; as *Sus, Equus, Camelus, Rhinoceros, Manis, Myoxus, Spalax, Cricetus, Viverra, Herpestes, Erinaceus,* the genera of bats; *Megaderma, Nycteris, Rhinolophus, Pteropus,* the family of the *Lemurids,* the genera of the apes; *Cercopithecus, Semnopithecus, Inuus, Cynocephalus, Hylobates, Simia.* To Africa, in particular, are peculiar the genera *Camelopardalis, Hippopotamus, Orycteropeus Cercopithecus;* while in a similar manner to the island of Madagascar are peculiar the *Centetes, Lemur, Lichanotus,* and the genus *Cheiromys,* a rodent-like quadrumane, which approaches the *Lemurids* in form. Most of the species of antelopes are also exclusively African. Most of the *Marsupial* species are found in Australia and the adjoining islands; while the genus *Didelphys* alone is American,—Africa, as well as Europe, not possessing a single species of this division. If we take into consideration the entire class of mammals, exclusive of the *Cetaceans* and *Phocæ,* then the *Rodents* will be found to form one-third of the entire number of species, the *Carnivora* and *Cheiroptera* together about one-third also, while the remaining third is formed, for the greater part, of the Quadrumanes and Ruminants; and especially of the Marsupials and insectivorous *feræ.* With the exception of some species of bats and of the true whales, Mammals are not tied, like birds of passage, to make strictly limited migrations; but inhabit the same districts in winter and summer both. On the other hand, different species hybernate, and pass a greater or less portion of the year without food in caves and hiding-places. Amongst such in Europe are, for example, the bat, the hedgehog, the hamster, the marmot, and various other species of rodents, forming the genus *Myoxus;* and in the north the bears. (*See* article on Hibernation.) With reference to the classification and division of animals of the section *Mammalia,* that proposed by Cuvier is undoubtedly one of the best, if not the best, *par excellence,* as it possesses many advantages over that adopted by Linnæus. In the present article, therefore, Cuvier's system has been followed; and the great naturalist himself gives an outline of his object and reasons in the last edition of his "Animal Kingdom. The following are his words :—"The characters by which Mammalia differ most essentially one from another, are derived from the organs of touch, from which results their degree of dexterity, and from the organs of mastication, which determine the nature of their food ; and upon these very closely depends not only everything which is connected with the digestive functions, but a variety of other circumstances relative even to their degree of intelligence. The perfection of the organs of touch is estimated by the number and mobility of the digits, and the extent to which they are enclosed in a claw or hoof. A hoof which completely encloses that part of the digit which touches the ground, precludes the exercise of it as an organ of touch or prehension. The opposite extreme is where the nail, in the form of a single lamina, covers only one side of the end of the digit, leaving the other side in possession of all its delicacy of touch. The kind of food is indicated by the molar teeth, to the form of which the articulation of the jaws invariably corresponds. For cutting flesh, the molar teeth must be trenchant and serrated, and the jaws fitted together so as to move like the blades of a pair of scissors, simply opening and closing in the vertical direction. For bruising grains and roots, the molar teeth must have flattened crowns, and the jaws a horizontal motion ; and further, that the grinding surface may be always unequal, like a millstone, the teeth must be composed of substances of different degrees of density, and consequently wearing down in different proportions." (With regard to this last-mentioned peculiarity, *see* art. HORSE.) Cuvier's arrangement is as follows :—

CLASS MAMMIFERES.

Order I. BIMANA.—Man.

Order II. QUADRUMANA.—Two families.—1. Apes and Monkeys ; and 2. *Macaucos* (*Lemur*, according to Linnæus.)

Order III. CARNASSIERS.—Family 1. *Cheiroptera*, (Bats.)—2. *Insectivora*, (Hedgehogs, Tenrecs, *Tupaia*, Shrews, *Mygale*, *Chrysochloris*, *Talpa*, *Condylura*, *Scalops*.)—3. *Carnivora*. Tribe 1. *Plantigrades :* Bears, Raccoons, (*Procyon*,) *Panda*, *Benturongs*, Coatis, (*Nasua*, Storr.,) Kinkajous, Badgers, Gluttons, Ratels. Tribe 2. *Digitigrades :* Martens, Skunks, Otters, Dogs, Civets, Genets, *Paradoxurus*, *Ichneumons*, (*Herpestes*, Illiger.) Suricates, *Crossarchus*, *Proteles*. The last subdivision of the Digitigrades is composed of the Hyænas and the Cats, in which last the sanguinary development is at its height. Tribe 3. *Amphibia :* the Seals, (*Phocæ*, Linn.) and the Walruses, (*Trichecus*, Linn.)

Order IV. MARSUPIALIA.—Subdivision 1. Opossums, Dasyurus, *Perameles*. Subdivision 2. *Phalangista*. Subdivision 3. The Kangaroo Rats, (*Hypsiprimnus*, Illiger,) the Kangaroos, the Koalas, and the *Phascolomys*.

Order V. RODENTIA.—The Squirrels, (*Pteromys* and *Cheiromys*, Cuvier,) *Echimys*, *Hydromys*, Capromys, the Rats proper, the Jerbilles, *Meriones*, the Hamsters, *Cricetus*, and *Arvicola*, the Rats, the Souslik, *Myoxus*. Also the Feld Mice and Rats, the Lemmings, the Jerboas, (*Dipus*,) the Beavers, the Porcupines, the Hares, (*Lepus*, Linn., including the *Lagomys* of Cuvier,) the *Capybara*, the Guinea-pigs, the Agoutis, (*Chloronys*,) the Pacas, and the Chinchillas.

Order VI. EDENTATA.—Tribe 1. *Tardigrades :* the Sloths, (*Bradypus*, Linn.) Tribe 2. Ordinary *Edentata :* the Armadilloes, (*Dasypus*, Linn.,) and the sub-genus *Chlamyphorus*, the Aard-Vark and the Ant-eaters, the Pangolins, (*Manis*, Linn.) Tribe 3. The Monotremes, the *Echidna*, and the *Ornithorhynchus*, (*Platypus*, Shaw.)

Order VII. PACHYDERMATA.—Family 1. Proboscidians : Elephants and Mastodons. Family 2. Ordinary *Pachydermata :* the Hippopotamus, the Hogs, the Rhinoceroses, the Damans, (*Hyrax*,) and the Tapirs. Family 3. *Solipeda :* the Horses, &c., (*Equus*, Linn.)

Order VIII. RUMINANTIA.—1. No horns : the Camels, including the Llamas, and the Musks. 2. True horns, shed periodically : the Stags or Deer, (*Cervus*, Linn.) 3. Persistent horns : the Giraffe. 4. Hollow horns : the Antelopes, the Goats, the Sheep, and the Oxen.

Order IX. CETACEA.—Family 1. Herbivorous *Cetacea :* the Manatees, the *Dugongs*, and the Rytina, (Illiger.) Family 2. Ordinary *Cetacea :* the Dolphins and the Porpoises, the Narwhals, (*Monodon*, Linn.,) the Cachalots, and, finally, the Whalebone Whales, (the *Balæna* of Linnæus, including the *Balænoptera* of Lacépède.)

The above is a digest of the classes as given in Cuvier's last edition of the "Règne Animal." Amongst the ungulate animals, according to Cuvier, the first is Man, and the order which comes nearest to Man is termed the *Quadrumanna*,—*i.e.*, has hands on the four extremities. Another order, termed the *Carnivora*, has not the thumb free. Those animals whose digits are much sunk, and which are distinguished by the absence of incisor teeth, are called *Edentata*. The *Ruminantia*, by their cloven feet, their want of upper incisor teeth, and by their complicated stomach, form an entirely separate class to themselves. All other quadrupeds with hoofs might be united into a single order, which, according to the French naturalists, might be called *Pachydermata*, or thick-skinned animals, the elephant alone excepted, having some remote affinities to the order Rodentia. In the last degree in the scale of mammals come those which have no hinder extremities, and whose fish-like form and entirely aquatic habits would lead us to place them in some separate class, if it were not that their domestic economy is in all respects perfectly similar to the class in which they are catalogued. These are the warm-blooded fishes of the ancients, and the *Cetacea* of our naturalists ; and they combine the powers of other Mammalia with the faculty of suspending themselves in or upon the sea ; they consequently appear to possess double advantages. In the affinities between the various classes of Mammalia, the different species will be seen to descend in a corresponding ratio as they diverge from the *Quadrumana ;* so, as it is well observed in an article on the subject in Brande's Dictionary, "the scheme may be likened to a cone, of which Man is the culminating pinnacle."—*Ref.* Cuvier's *Animal Kingdom ;* Professor Owen's Works ; Hoeven's *Handbook of Zoology ;* the *English Cyclopædia*—Natural History ; &c., &c. (*See* also separate articles on the various classes.)

Mammoth, *măm'-moth*, (*Elephas primigenius*,) the Russian name for an extinct species of elephant, the bones of which resemble those of the existing Asiatic species, but whose grinders have the ribands of enamel narrower and straighter, the alveoli of the tusks longer in proportion, and the lower jaw more obtuse. The mammoth was thickly covered with hair of three different kinds; one consisting of stiff black bristles a foot in length; another of coarse flexible hair, and the third of a kind of wool. The bones and tusks of the mammoth are found throughout Russia, and more particularly in Eastern Siberia and the Arctic marshes, &c. The tusks form an article of commerce, and are much used in making the inferior kinds of ivory goods. In Siberia, during 1799, a whole mammoth was discovered by a Tungusian, named Schumachoff, with the whole of the soft parts preserved in the snow. Schumachoff, who generally went to hunt and fish on the peninsula of Tarnut after the fishing season of the Lina was over, erected a cabin for his wife on the bank of the lake Oncone, and then embarked to search along the coasts for mammoth tusks. One day he saw among the blocks of ice a shapeless mass, but did not then discover what it was. In the course of the next year, he saw that this object was more disengaged from the ice, and that it had two projecting parts; towards the end of the summer of 1801, the entire side of the animal and one of his tusks were quite free from ice. The summer of 1802 was cold; but in 1803, the ice between the earth and the mammoth having melted more rapidly than the rest, the plane of its support became inclined, and the enormous mass fell by its own weight on a bank of sand. Dogs and wild beasts soon devoured most of the flesh; but it was found to be a male, with a long mane on the neck, but without tail or proboscis, both having been probably devoured. It is asserted that the places of the insertion of the muscles of the proboscis were visible in the skull. The entire carcass was 9 feet 4 inches high; 16 feet 4 inches long, from the point of the nose to the end of the tail, without including the tusks, which were 9 feet 6 inches, measuring along the curve. The two tusks together weighed 360 lb. avoirdupois, and the head, with the tusks, 414 lb. Portions of the hair with which the animal was clothed are now to be seen in the museum of the College of Surgeons. Remains of the *Elephas primigenius* have been found in large quantities in the British isles. They have been found off the coasts of Norfolk and Suffolk, and in many parts of Essex; at Herne Bay, in the valley of the Thames; at Sheppey, Lewisham, Woolwich, and the Isle of Dogs. They have been dug up in the streets of London, as in Gray's Inn, and in Charles Street, St James's Square. They have also been dug up at Kensington, Kew, Henley Bottom, Wallingford, and Dorchester. They have also been found at Brighton, and in districts of Worcestershire, Warwickshire, Staffordshire, Northamptonshire, Yorkshire, and the celebrated cave at Kirkdale.

Mampalon, *mam'-pal-on*, a curious animal found in Borneo, and allied to the ichneumons, (*Cynogale Bennettä.*) It is remarkable for its very long and stout "whiskers," hairs which proceed from the lips and behind the eyes.

Man, *măn*, (Ger. *Mann*, Fr. *homme*, Lat. *homo*, Gr. *anthropos*,) is the highest and noblest of all created beings that inhabit this earth,—incontestably the lord of the creation. Him all other creatures serve, by him even the elements are brought into subjection. He alone possesses the power of adapting himself to the most opposite circumstances, and he alone is found to be improving his condition, generation by generation. Considered as an object of natural history, man is a mammiferous animal belonging to the order Bimana, or two-handed, of which he constitutes the sole genus Homo. The distinguishing characteristics of man are two hands, the erect posture, teeth approximated and of equal length, the inferior incisors perpendicular, prominent chin, rational, endowed with speech, unarmed, defenceless. "That," says Cuvier, "which constitutes the *hand*, properly so called, is the faculty of opposing the thumb to the other fingers, so as to seize upon the most minute objects; a faculty which is carried to its highest degree of perfection in man." The next series of characters are those by which he is by nature adapted to the erect posture, the head nicely balanced on the summit of the vertebral column, and the muscles of the trunk and limbs which contribute to the maintenance of the erect posture, largely developed. The face is placed immediately beneath the brain, so that its front is nearly in the same plane as the forehead, which is peculiarly characteristic of man. The vertebral column in man has its curves so arranged that when the body is in an erect posture, a vertical line from its summit would fall exactly on the centre of its base; and it increases considerably in size in the lumbar region. The lower extremities in man are remarkable for their length, which is proportionally greater than in any other mammal except the kangaroo. The human foot is, in proportion to the size of the body, larger, broader, and stronger than that of any other mammal save the kangaroo; and hence man alone has the power of standing upon one foot. The brain of man does not differ so much in conformation from that of the higher mammals, as the superiority of his mental endowments might have led us to anticipate. (*See* Brain.) The absence of any natural weapons of offence and of direct means of defence are remarkable characteristics of man, and distinguish him from even the most anthropoid of apes, whose enormous canines have no relation to a carnivorous regimen, but are instruments of warfare. The slow growth of man, and the length of time during which he remains in a state of dependence, are also peculiar to him. He also possesses, in a remarkable degree, the power of adaptation to varieties in external condition which renders him in a great measure independent of them. He is capable of sustaining the highest as well as the lowest extremes of temperature and of atmospheric pressure, and of subsisting on a great variety of food. But most of all is man distinguished from other animals by those mental endowments, and by the habitudes of life and action thence resulting, which must be regarded as the essential characteristics of humanity. It is in adapting himself to the conditions of his existence, in providing himself with food, shelter, weapons of attack and defence, &c., that his intellectual powers are first called into active operation;

and when thus aroused, their development has no assignable limit. The capacity for intellectual progress is one of the most remarkable peculiarities of man's physical nature. The power of articulate speech, which, so far as we know, is peculiar to man, is one of the most important aids in the use and development of the human mind. But the mainspring of human progress may be said to lie in that aspiration after something nobler and purer which is peculiar to the human race, and which is connected with another element in his nature which it is difficult to isolate or define, but which enters, penetrates, and blends with his whole physical character. It is the soul, in whatever way we may define it, which seems to constitute the distinctive peculiarity of man. —(Carpenter's *Principles of Human Physiology.*) "Man," says Professor Green, "is unquestionably endowed with that structure the perfection of which is revealed in such a balanced relation of the parts to a whole as may best fit it for a being exercising intelligent choice and destined for moral freedom. It is not, therefore, an absolute perfection of the constituents singly, but the proportional development of all, and their harmonious constitution to one, for which we contend; a constitution which implies, in a far greater degree than in any other animal, a balanced relation of the living powers and faculties, and which requires, therefore, in man, pre-eminently, the endowment of rational will as necessary for the control and adjustment of the balance. Man has not the quick hearing of the timid herbivorous animals; but it was not intended that he should catch the sound of distant danger and be governed by his fears: he has not the piercing sight of the eagle, nor the keen scent of the beast of prey; but neither was man intended to be the fellow of the tiger or a denizen of the forest. Hence the departure from the perfect proportion of man, which we observe in the inferior animals, may be regarded as deformities by exaggeration or defect, dependent upon a preponderance of a part that necessitates a particular use, or the absence of a part that deprives the animal of a power. Protrude the jaws, you have a voracious animal; lengthen the ears, timidity is expressed; let the nose project, and the animal is governed by its scent; enlarge the belly, and you are reminded of the animal appetites."—(*Vital Dynamics.*)

MANAKINS, *man'-ak-ins*, a group of birds called scientifically *Piprinæ*, and belonging to the family of the chatterers or Ampelidæ. Most of them belong to South America. The golden winged Manakin, (*Pipra chrysoptera*,) and the Cock of the Rock, are examples of this group.

MANATEE, *măn-ă-tee'*, an aquatic animal belonging to the group called Sirenia, and found on the coasts of the Atlantic. It often travels up the rivers in order to feed on the rich vegetation of their banks, and is much persecuted by the natives for the sake of its skin, flesh, and oil. The skin is very thick and tough, and the weapon which is used by the natives is a three-cornered file fixed into a wooden shaft. It is sometimes called the Lamantine. The flesh is especially valuable, because it can be easily dried, and can be preserved for a year without becoming unfit for food. There are several species of Manatee. The genus to which the animals belong is *Manatus*.

MANAVIRRI. (*See* KINKAJOU.)

MANDIBLES, *măn'-de-bls*, (from Lat. *mando*, I chew,) the upper and lower parts of the beak in birds. In Ent., the upper and under pairs of jaws.

MANDRILL, *man'-drill*, a large baboon found in Guinea, (*Papio mormon*,) and allied to the Drill, *q.v.* It is remarkable for the bright colours of the skin, the projecting ridges of the face being brilliant blue, on which are drawn lines of scarlet and purple, and the hind quarters of a rich violet.

MANGABEES, *man'-găb-ees*, a group of monkeys belonging to the genus *Cercocebus*, and found in Western Africa. They are easily tamed, and are often sent over to Europe.

MANGO-FISH, *man'-go*, (*Polynemus Risua*,) a genus in Ichth., usually termed the Polynemus, and belonging to the class *Percidæ* of Cuvier, on account of the ventral fins being inserted farther back than the pectorals. The mango-fish is further distinguished by having several long filaments beneath the pectoral fin, which filaments are, in fact, free rays of that fin. The teeth are very minute and dense in quantity, and are recurved, like the teeth of a carding-machine. The form of the body generally resembles that of the perch, with the peculiar exceptions mentioned above; the muzzle projects over the mouth; the eyes are large, and placed very forward; and, finally, the dorsal fins are short and widely separated, while the caudal fin is large and more or less forked. The mango-fish is esteemed a great delicacy in India, and it is found principally in Channel Creek, off Saugor, and in and about the mouths of the rivers which intersect the Sunderbunds. The greatest interest is attached to it from the fact of its yielding isinglass; which fact was first discovered by Dr Cantor, in the year 1838. Dr Cantor found that a mango-fish weighing two pounds would yield, on the average, sixty-five grains of isinglass, an article which sells in India at the rate of sixteen rupees, or £1, 12s. per pound. Several other varieties of the mango-fish are found in the warm latitudes of Africa and America, and nearly all bear a close resemblance to the type which has just been described.

MANGUE. (*See* KUSIMANSE.)

MANIS, *may'-nis*, a genus of animals belonging to the family Dasypidæ. Their bodies are covered with thick, horny scales, very sharply edged. When alarmed they roll themselves up, so as to present the edges of their scales to the foe. They are burrowing animals, and are natives of Asia and Africa.

MANTIS. (*See* LEAF INSECT.)

MANTIS-SHRIMP. (*See* CAPRELLA.)

MAN-OF-WAR BIRD. (*See* FRIGATE-BIRD.)

MARA, *mah'-rah*, a rodent animal, sometimes called the Patagonian Covey, (*Dolichotis patachonicus.*) It lives in 'forms' like the hare, and a single couple usually occupy each form.

MARGAY, *mar-gay'*, one of the Ocelot or Tiger cats inhabiting tropical America.

MARE, the female of the horse. (*See* EQUIDÆ and HORSE.)

MARMIGNATTO. (*See* AGELENIDÆ.)

MARMOSET, *mar-mŏ-zett'*, a beautiful little monkey of tropical America, (*Jacchus vulgaris*,) sometimes called the Ouistiti on account of its little whistling note. It is remarkable for the radiating tufts of white hair, which springs from either side of the head.

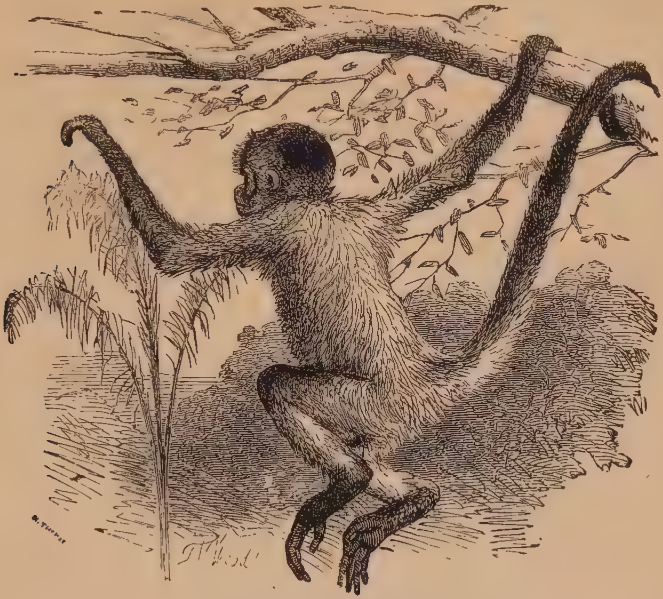
MARMOT, *mar'-mot*, (Ital. *marmotta*,) (*Arctomys*,) a genus of rodent animals, of which there are many species. Cuvier observes, with regard to the marmots, that they have five molar teeth on each side above, and four below, bristling with points; accordingly, some species are easily induced to feed on flesh, and will eat insects as well as vegetables. They are short-legged animals, with a tail round and rather short; they also possess a large and flattened head. They pass the winter in a state of torpor, in deep holes, the entrance of which they close up with hay. They are generally gregarious and are easily tamed. The Alpine marmot (*Arctomys alpinus*) is about as large as a rabbit, with a short tail, and covered with a yellowish-gray fur, varied with ash-coloured tints towards the head. This species inhabits the Alps and Pyrenees just below the region of perpetual snow. The Polish marmot is about the same size as the one last mentioned, and of nearly the same colour. It inhabits small hills, and mountains which are but slightly elevated, in Poland, and it frequently burrows in the hardest soils. Besides these, there are many other European and Asiatic specimens. In conclusion, it may be observed that the marmots partake of many of the characteristics of the squirrels, and that they are both herbivorous and carnivorous. The American marmot (*Arctomys ludovicianus*) will be found described under the article PRAIRIE DOG, (which *see.*)

MARROW, *mar'-ro*, (Lat. *medulla ossium*,) in Anat., is a light fatty substance lodged in the interior of the bones. Like ordinary adipose tissue, it consists of vesicles containing fat, with blood-vessels distributed to them. It is usually of a yellow colour, with 96 parts of fat, three of water, and one of areolar tissue, in 100 parts. In some parts it is of a reddish colour. In birds, for the sake of lightness, the larger bones, instead of being filled with marrow, contain air, which passes into them from the lungs. In the fœtus the bones do not contain marrow, but a transparent reddish fluid like bloody serum, only more consistent.

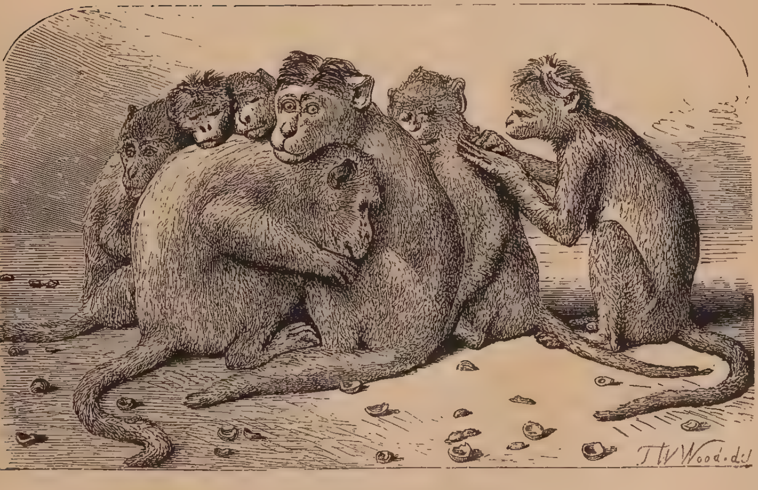
MARSUPIALIA or MARSUPIATA, *mar-su-pe-ai'-le-ă*, *mar-su-pe-ai'-tă*, (Lat. *marsupium*, a bag,) a term applied to an extensive group of mammalia, which differ altogether from others, both by their organisation and by the different varieties of nourishment which they consume. As a necessary consequence to these peculiarities, we find their structure altered accordingly, and we find among them the organs of progression, prehension, and digestion, so adapted to their various wants and habits, that we may trace in them some of the prominent characteristics of the carnivorous, insectivorous, herbivorous, and rodent forms of other mammalia. Scaliger distinguished the first species of marsupialia brought under the notice of zoologists, by the name *Animalia crumenata;* that is, in other words, Purse-bearing animals. The leading feature in these mammals is the premature birth of their young, which are nourished, after their exit from the uterus, by the pouch or marsupium of the mother, in which the teats are placed, to which latter they attach themselves immediately on birth. The ursine opossum is an instance of this class, and is a native of Van Diemen's Land. The great type of the genus, however, is the KANGAROO, a description of which will be found given in an article bearing that name. (*See* KANGAROO, OPOSSUM, &c.)

MARTEN, *mar'-ten*, (Du. *marter*,) an elegant little animal, belonging to the family Mustelidæ, or Weasel tribe. There are two varieties of this species, namely, the beech marten and the pine marten; the former being possessed of a white throat, and the latter of a yellow one. The beech marten (*Mustella Martes*) differs but little from the weasel in form, with the exceptions of the body being slightly more elongated, the head a little more pointed, and the fur generally longer. The martens have also an additional molar tooth in both jaws, and also the larger grinder of the lower jaw has a small internal tubercle, which does not exist in that of the weasels. The tail is about as long as the body; the upper parts grayish or yellowish-brown, and the feet and tail of a chocolate hue; the throat has already been described. The limbs are of moderate length; on the fore foot the first toe is very short, the second and fifth equal in length, and the fourth the longest; on the hind foot the proportions are similar: the soles of all are covered with hair, and the claws are large, compressed, tapering, and arcuate,—that is to say, linear and bent like a bow. The fur is dense, rather soft, and long, being longer on the hind parts, especially on the tail. The under fur is thick and woolly. When young, the marten is of a darker colour, and in summer the fur is always of a lighter hue than in winter. The marten is generally distributed throughout England and Scotland, and in Europe. In the north of Scotland, it is termed the taghar and polecat. In its habits it partakes of the qualities of the fox, as it is a destructive depredator at night-time of farm-yards, although it shuns men as much as possible. Its general length, from nose to tail, is about a foot and a half. The female has two litters, at least, in the year, and produces two or three cubs at a time. The *pine marten* is an inhabitant of North America, where it frequents the woody districts from the Atlantic to the Pacific: it is also found about the region of Mount Caucasus, in Europe, and even in Sweden and Norway. These martens are very destructive to small game and the eggs of birds, their lives being one continual plundering of the nest of the partridge, the retreats of the squirrel, and the *form* of the hare. When deprived of these, they prey on field-mice, dormice, and even lizards and serpents. When the time has arrived for the female to bring forth her young, she takes forcible possession of a squirrel's nest, and enlarges it so as to suit her requirements. The skins of the pine marten are imported in large quantities into Great Britain, as their fur is much used by furriers; upwards of 100,000 being annually brought into the country. (*See* also WEASEL.)

MARTIN, *mar'-tin*, (Fr. *martinet*,) (*Hirundo urbica*.)—This bird belongs to the Hirundinidæ or Swallow family, a class of birds belonging to the order Passeres, tribe Fissirostres, and subtribe *Fissirostres diurnæ*. The martin usually makes its appearance in this country a few days later than the swallow. It appears to commence its northern migration in Africa, crossing the Mediterranean along with the swallows; but its wings being on a smaller scale, it is prevented arriving so soon as the larger-winged bird. It always endeavours, like the swallow, to establish itself near the



BLACK FACED SPIDER MONKEY.



BONNET AND MACAQUE MONKEYS.

habitation of man, and as it is not a destructive bird to plants or grain, it is usually regarded with favour. The nest of this bird is generally fixed under the eaves of houses, or in the upper angles of windows; whence its name of *house-martin* and *window-martin*, according to Mr Yarrell. The nest is built of clay, which is laid on in alternate stripes, day after day, until the whole is completed. After the exterior wall is finished, the cavity within is lined with hay and soft feathers. The martin produces three, and occasionally four broods in the season. The eggs are four or five in number, and are smooth and white. After incubation and hatching has been completed, which operation lasts thirteen days, the parent birds devote themselves to feeding their nestlings. The little birds put out the head on the arrival of the food, and eagerly receive it from the beaks of the old ones. The martin is one of the most regular of summer visitors to this country, and considerable numbers also go to Denmark, Sweden, and Norway; some even as far north as Lapland. It leaves about the middle of October; and if any of its last brood are unfledged, it deserts them without the slightest compunction. In the adult male the beak is short and black; the top of the head and back of a glossy bluish black; the wing and tail dull black; the chin and under surface of the body white; and the claws curved, sharp, and of a grayish horn-colour. The whole length is slightly more than five inches and a quarter; and from the carpal joint to the end of the first quill-feather of the wing the extent is about four inches and a quarter. The *sand martin*, or *bank martin*, is another variety. This bird is the smallest of the *Hirundinidæ* that visit this country, as it is also the earliest. The whole length is about four inches and three quarters. The beak of the adult birds is dark brown, the irides hazel; the head, with back and wing-coverts, as well as tail-coverts, of a mouse-brown colour; the throat, breast, and under surface of the body, pure white; and the legs, toes, and claws, dark brown, with a few short buff-white feathers on the posterior edge of the tarsus, just above the junction of the hind toe. —(*Yarrell.*) The American purple martin (*Progne purpurea*) is a visitor to North America, where it arrives in February at New Orleans, and Boston towards the end of April. The colour of the male is a rich deep purplish blue, with the wings and tail brownish black: the female is of a more dusky appearance, and has the under surface of the body varied with yellowish stains. The purple martin feeds on the larger-winged insects; as wasps, bees, &c. It builds its nest of sticks and grass about ten days after its arrival, and lays from four to six eggs. Audubon the naturalist observes of this bird, with regard to the estimation in which it is held:—"I had a large and commodious box built and fixed on a pole for the reception of the martins, in an enclosure near my house, where, for some years, several pairs had reared their young. The erection of such houses is a general practice, the purple martin being considered as a privileged pilgrim, and the harbinger of spring." In its flight, the purple martin resembles the common martin first mentioned, and it sweeps along at a short distance from the level of the ground, in the pursuit of its favourite prey. Some specimens of this bird have been shot in England. (*See* also SWALLOW FAMILY.) The Fairy Martin of Australia, (*Hirundo Ariel*,) belongs rightly to the swallows. It is remarkable for the curious flesh-shaped nest which it builds of clay and mud, and for its gregarious propensities.

MASTIFF, *măs'-tif*, (*Canis mollossus*,) one of the noblest, as well as the most powerful, varieties of the canine family. The mastiff is distinguished by a large head, with a broad muzzle to match, ears of moderate size and dependent, a heavy brow, thick drooping lips, and a well-proportioned strong body, and a full tail. The strength of the mastiff is immense, and its vigilance and faithfulness as a house-dog and guard are unrivalled. In Jesse's "Anecdotes of Dogs" there are many stories related of the mastiff, which exhibit its character in very favourable lights. The following is amply corroborated. A baronet of Oxfordshire had a large mastiff which guarded the premises, but which was never shown any kindness or attention beyond being retained for his fidelity. One night, as this gentleman was going to bed, attended by his valet, an Italian, the mastiff silently followed them upstairs, and tried to gain admittance into the baronet's chamber. At first this was refused; but on the animal's continuing to make a noise at the door, it was admitted, and suffered to lie down on the floor. At midnight the chamber-door opened, and the mastiff sprung up with a growl, and fixed on the intruder, holding him firmly until a light could be brought, when the person was found out to be the Italian valet, who confessed that it was his intention to murder his master and rob the house. It is really wonderful what presentiments of approaching danger these animals have, on account of their close observation and watchful jealousy.

MASTODON, *măs'-to-don*, (Gr. *mastos*, a nipple; *odous*, a tooth,) the name given by Cuvier to a genus of extinct fossil quadrupeds, allied to the elephant, so called from certain remarkable mamillary processes on the teeth. The remains of the mastodon are found associated with those of the mammoth in the tertiary beds of England. A species of mastodon, however, larger than that found in Europe, has been found in many parts of North America. A specimen of the animal, nearly perfect, was obtained in the state of Missouri in 1840. It was exhibited at the Egyptian Hall, Piccadilly, London, in 1842 and 1843. It was greatly distorted; but having been purchased by the trustees of the British Museum, it was made to assume its natural proportions, and now forms an attractive feature in the portion of that building devoted to palæontology. Its proportions are as follows:—Extreme length, 20 feet 2 inches; height, 9 feet 6¾ inches; cranium, length, 3½ feet; width, 2 feet 11 inches; tusks, extreme length, 7 feet 2 inches; circumference at the base, 27 inches. The remains were found imbedded in a brown sandy deposit, full of vegetable matter, with recognisable remains of the cypress, tropical cane, swamp moss, stems of the palmetto, &c.; and this was covered with beds of blue clay and gravel to a thickness of about fifteen feet. Indian-flint arrow heads were also found about and under the bones of the skeleton.

MATAMATA, *mah-tah-mă-tah'*, a remarkable river tortoise of South America, (*Chelys mata-*

mata.) The shell is rather small and deeply ridged, and the neck is very long and stout. The head and part of the neck are decorated with membranous tufts. It is a voracious and formidable reptile, feeding on fish and frogs, and securing them by a dart of its long neck and a snap of its sharp-edged mouth.

MAT, SEA. (*See* FLUSTRADÆ.)

MAY-FLY, *May'-fly*, (*Ephemera vulgata,*) is the common type of the neuropterous insects of the genus Ephemera. It is very plentiful in the early part of summer about the banks of rivulets and stagnant waters. In appearance it is of a somewhat greenish-brown colour, with transparent wings mottled with brown; and there are thin, long, black bristles attached to the extremity of the body. During the day the May-fly is generally observed with its wings closed in a quiescent posture; but in the evening it flutters about over the surface of the water which it affects. (*See* article EPHEMERA, which enters into the scientific description of this insect.)

MEAL-WORM, the larva of a common beetle, *Tenebris molitor*.

MEALY BUGS, a group of insects belonging to the Coccidæ, and causing great mischief in the garden. The cochineal insect belongs to the same genus.

MEDUSA, *me-du'-să*, or GORGON-HEADS, (*Ophiuridæ,*) a species of marine animals belonging to the class Echinodermata, and commonly known by the appellation of lizard-tailed star-fishes. The *gorgon-heads* have all an orbicular depressed body, with five arms, which are cylindrical, jointed, and very flexible; these arms are often extremely long, and subdivided into branches; they are covered with scales, somewhat like the tails of serpents, and are very fragile. Their means of progression are consequently very different from those of the true star-fishes; as, when they move, they employ the two arms that are nearest the point to which they wish to proceed; and the one also farthest from that point. The two in front pull the animal along by means of hooks at their ends, while the one behind is pushed into the sand, and is employed to shove it on. The Ophiuridæ live nearly exclusively on sandy shores, and on the approach of any danger they hide themselves in the mud; like several others, they quickly recover the loss of their arms, as they grow again in a few days. There are numerous varieties of this family, of which the one just described is the type.

MEERKAT, *mere'-cat*, a pretty animal of Southern Africa, (*Cynictis sevaillantri,*) allied to the Ichneumon, and remarkable for its long and bushy tail.

MEGAPODIUS. (*See* TURKEY-BRUSH.)

MEGATHERIUM, *me-gă-the'-re-um*, (Gr. *megas*, great, and *therion*, beast,) a name given by Cuvier to the typical representative of a series of endentate quadrupeds, the largest and most gigantic of terrestrial mammals. Two specimens of this animal have been found in America, the one termed the *Megatherium Cuvieri*, and the other the *M. Jeffersoni*,—the latter being first described by President Jefferson, as may be seen by the "Transactions of the American Philological Society," (iv. 246.) The haunches of the megatherium named after Cuvier must have exceeded five feet in width, while its body was about twelve feet long and eight high. Its feet were a yard in length, and terminated in formidable compressed claws of great size; its tail was also of great length and thickness, exceeding the size of that member in either living or extinct quadrupeds. The head of the megatherium was of comparatively small size, and the cranium presents many of the peculiarities of the sloth; from which circumstances it has been termed the *giant sloth*. Not much—indeed, to say truly, nothing—is known of the habits of this immense animal, except that it must have, according to the authority of eminent naturalists, possessed a scaly armour; whence it must also have been closely allied to the armadillo family.

MELES. (*See* BADGER.)

MELEOGRIS. (*See* TURKEY.)

MELIPHAGA. (*See* HONEY-EATERS.)

MELLISUGA. (*See* HUMMING BIRDS.)

MELLIVORA. (*See* RATEL.)

MELOË. (*See* OIL BEETLE.)

MELOLOUTHA. (*See* COOKCHAFFER.)

MELOPSITTACUS, *mĕl-op-sit'-tak-us*, generic name of the warbling Panakeets of Australia, sometimes called Grass, or Shell-Panakeets.

MELURSUS, *mel-ur-sus*, generic name of the Aswail, or Sloth-Bears of India.

MENOPOME, *men-ŏ-pome*, one of the false lizards of American rivers, (*Protonopsis horrida.*) It is very voracious and powerful, and is much dreaded by the fishermen, who call it by various characteristic names, such as tweeg, hell-bender, mud devil, and ground puppy.

MENURA. (*See* LYRE-BIRD.)

MEPHITIS. (*See* SKUNK.)

MERGANSER, *merg-an'-ser*, an aquatic bird, allied to the Snear and Goosander. It is a good diver, and pursues fish under water.

MERINO. (*See* SHEEP.)

MERLANGUS. (*See* WHITING.)

MERLIN, *mer'-lin*, a pretty little British hawk, (*Hypotriorchis æsalon,*) which is sometimes taught to chase larks, partridges, or grouse. It is sometimes called the Stone Falcon, because it is fond of sitting on stones and thence surveying the prospect.

MEROPS. (*See* BEE-EATER.)

MICE, or MOUSE FAMILY, *mise*, (Ang.-Sax.,) a family of rodent mammalia belonging to the order Glires. The domestic mouse (*Mus musculus* of Linnæus) has its ears about half the length of the head, the tail a little shorter than the head and body, and the general colour of the upper portions of the body is grayish-brown, while that of the lower parts is yellowish-gray. The mouse is, in fact, but a small edition of the rat, although its head may be said to be proportionately less elongated than the former species. The body of the mouse is moderately full, the head tapering, the muzzle pointed, the eyes prominent, and the ears broad and rounded, the legs being short, and the feet rather delicate than otherwise. It seems to be entirely dependent on man, as it is never found far from his dwelling. Although naturally timid, mice occasionally exhibit great boldness, and they venture quite close to any one who does not molest them. On account of their fecundity, coupled with their thievish propensities, they are extremely destructive in houses, devouring everything they can get at,—meal, flour, bread, cheese, butter, tallow; in fact, nothing edible seems to escape them. Within the house, their great enemy is the cat; but even she is unable quite to extirpate them, and thus they do considerable mischief. Their ravages, however, are not confined to houses merely, as they do much damage in farm-yards by entering corn-stacks, where they gnaw away to their heart's content. Their enemies, besides man, and the cat and ferret, are weasels, owls of various species, and the kestrel, all of which make the mouse their prey. It has many litters during the year, and from five to seven young ones in each litter; consequently, it soon increases considerably if undisturbed. The domestic mouse is common throughout the whole of Europe, and, indeed, has extended to America and Australia. Another variety of the *Murina*, the wood-mouse, (*Mus sylvaticus*,) is likewise found throughout Europe, where it proves a powerful and bitter enemy to the agriculturist. It is generally found in fields and gardens, and it has a habit of piling up large stores of grain, acorns, nuts, and suchlike, as a provision for the winter season. It often takes possession of the deserted holes of moles, where it lays up its magazine. Its ears are about half the length of the head, the tail nearly as long as the head and body; the upper parts reddish-brown, and the lower grayish-white, with a little orange-red spot on the breast. The harvest mouse (*Mus messorius*) is one of the prettiest varieties of this little animal, and, in fact, it is one of the most elegant of our native quadrupeds. It builds its nest in standing corn, and during the harvest season it is carried into the barns along with the sheaves, in which places it breeds and multiplies in considerable numbers. Its whole length does not exceed two inches. Its colour is a light reddish-brown.

Microgaster. (*See* Ichneumon Flies.)

Midge, *mij*, (Sax. *mygge*,) a dipterous insect, belonging to the genus Chironomus, of the family Tipulidæ. It frequents marshy situations, and has a good many points of resemblance to the gnat. The proboscis is short, thick, and ends in two large fleshy lips; the antennæ are longer than the head, and are simple, being rarely pectinate; the palpi are longer than the proboscis, the eyes acute, and the ocelli wanting. The body and legs are long and slender, the wings narrow and elongate, and the halteres, or balancers, are naked, and proportionately longer than those of the diptera. In their flight, midges can be seen continually moving about in the air during the autumn, and they ascend and descend in a vertical line with a humming, buzzing noise.

Migration of Birds. (*See* Birds.)

Milipedes. (*See* Myriapoda.)

Miller's Thumb. (*See* Bull-head.)

Milous. (*See* Kite.)

Mink, *mink*, one of the semi-aquatic weasels of North America, the fur of which is valuable, and is sometimes substituted for that of the sable, to which it bears some resemblance. Its scientific name is *vison lutreola*.

Mino Bird, *mee'-noh*, an Indian Grakle, (*Gracula musica*,) which is a beautiful songster, and has the power of imitating almost any sound which it hears. It is often tamed and taught to speak.

Minnow, *min'-no*, (Fr. *menu*, small,) (*Leuciscus phoxinus* of Cuvier,) an abdominal malacopterigious fish, belonging to the family Cyprinidæ. It is variously termed the minnow, minim, or pink, and is one of the most prettily marked, as well as smallest, of the British Cyprinidæ. The top of the head and back are a dusky olive, mottled and lighter in colour on the sides; the under surface of the body is white and a fine rosy pink in summer; the irides and gill-covers silvery; dorsal fin pale brown; pectoral, ventral, and anal fins lighter in colour; the tail being brown, and of a lightish hue. *Ref.* Yarrell's *British Fishes*.

Miriki. (*See* Brachyteles.)

Mite. (*See* Acarus.)

Mocking-Bird, (*Mimus polyglottos*,) *mok'-ing*, (Fr. *moquer*, to mock,) a bird belonging to the dentirostral tribe, of the order Passeres and family Turdidæ. The mocking-bird is a native of America and the West Indies, and is remarkable for its vocal powers and faculty for imitating the songs of other birds, as well as different noises which it hears. Its voice is very full and strong, besides being musical, and capable of any modulation, to the softest notes; from the clear tones of the wood-thrush it can reach the savage scream of the eagle. It feeds on berries and fruits, and builds its nest in the immediate vicinity of man.

Mohair, *mo'-hair*, (Ger. *mohr*, Fr. *moire*,) a material for textile manufactures, consisting of the hair of a goat which inhabits the mountains in the vicinity of Angora, in Asia Minor. The Angora goats, after completing their first year, are clipped annually in April and May, and yield progressively from one to about four pounds' weight of hair. That of the female is considered to be of more value than that of the male, but both are mixed together for the market. Up to the year 1820, there was very little demand for this article in England, but now the quantity is very large. By a return of the Board of Trade, the total quantity of mohair imported into this country during the year 1856 was 2,928,411 lbs. In England, mohair is mostly spun, and to some extent manufactured at Bradford, and also in a less degree spun at Norwich. Mohair yarn is also worked up in Scotland. The average price of Angora goat's hair is about 1s. 10d. per pound. A large variety of articles are made from mohair; amongst others, many kinds of camlets, which exhibit great beauty and brilliance of surface. It is manufactured into plush, and is also used for coach and decorative laces, for buttons, braidings, and other trimmings for gentlemen's coats. It is, moreover, made up into a light and fashionable cloth, suitable for paletots, &c. Mohair dresses were worn by ladies a few years ago; but they have been superseded by alpaca cloth and other similar materials. At Bradford, and other places, much ingenuity is displayed in combining mohair with two or more fibrous substances, to produce what are termed fancy stuffs.

Mohr, *mo'hre*, an antelope of Western Africa.

Molars. (*See* Teeth.)

Mole, *mole*, (Dan. *mol*,) (*Talpa europæa* of Linnæus).—This animal belongs to the family *Talpidæ*, of which it may be taken as the type. The moles are small quadrupeds, having their bodies nearly of a cylindrical form; the neck short and thick; the head tapering to a pointed snout; the fore limbs very short and strong; the fore feet of great breadth, being furnished with remarkably long, strong, and straight claws; the hind feet small, with slender claws; the eyes minute, and concealed by the fur; the tail short and slender, and the hair soft and velvety. Moles possess six incisors in the upper, and eight in the lower jaw; and seven grinders above, and six in the lower jaw. The canine teeth are large and angular, being compressed. Their pointed muzzle, strong fore feet, and sharp teeth, enable them to make their way underground without much difficulty. The common mole is about five or six inches long, and the colour of its fur is usually black, although the tint varies considerably from that colour down to white. Earth-worms forms its principal staple of food, although it also feeds on frogs, snails, and small insects. It lives the greater part of its time underground; and it labours incessantly in excavating galleries, up and down which it can run and procure its prey, as well as escape its enemies. It is a native of Great Britain; but another variety of it exists in the Apennines in Italy. There are several species of moles and their kin. The Scalops or Sheen mole of North America, remarkable for its very long snout, which looks like the proboscis of an elephant. The Desman of Russia. The Chrysochlore or shining mole of Southern Africa, whose fur is glossy like silk, and gives out prismatic colours when the animal moves. The Star-nosed mole, whose snout is surrounded with a radiating circle of red fleshy projections. The Long-tailed mole or Condylure, in which the tail is half as long as the body.

MOLE-CRICKET. (*See* CRICKETS.)

MOLE-RAT, (*Bathyergus,*) a genus of animals that belong to the order Rodentia or Glires, and are natives of the Cape of Good Hope. It is about the size of a rabbit, and burrows underground, like its prototype the mole, throwing up large hillocks, which are exceedingly dangerous to travellers on horseback. There are two varieties of this animal at the Cape; one called the sand-mole, (*Bathyergus maritimus,*) just described, and the other the Cape mole-rat, (*B. capensis,*) which is called "*bless* mole' by the Dutch.—*Ref.* Baird's *Encyclopædia.*

MOLE, WATER. (*See* DUCKBILL.)

MOLLUSCA, *mol-lus'-kă,* (Lat.,) a class of animals belonging to the second great division of the animal kingdom, characteristically designated as being without a backbone. Mollusks may be briefly described to be animals covered with a soft moist skin, mostly forming over the back a duplication, free at the margin, and termed a *mantle.* The head is more or less distinct, is furnished with tentacles, and is often provided with two eyes. The shell is calcareous, mostly univalve; in some this covering is multivalve, in a few internal, and in others absent altogether. The organs of circulation and respiration are generally distinct, and the heart is always aortic. A nervous ring is also around the œsophagus, while the nerves proceed from ganglia, are various in number, and are principally directed to the peripheral parts of the body. Cuvier supposes that the veins of molluscous animals perform the function of absorbent vessels; their blood is of a white or bluish-white colour, and appears to contain a smaller portion of fibrin than vertebrated animals. These muscles are attached to various points of their skin, forming three tissues, which are more or less complex and dense. Their motions consist, principally, of contractions in different directions, which produce inflections and prolongations, or relaxations of their various parts; by which means they creep, swim, and seize upon objects, just as the form of those parts may permit; but as the limbs are supported by articulated and solid levers, they cannot proceed rapidly, or by leaps. To continue the remarks of Cuvier, the irritability of most of them is extremely great, and continues for a long time after they are divided. Their skin is naked, very sensible, and usually covered with a humour that oozes from its pores. No particular organ of smell has been discovered in them, although they possess that sense; it may, however, possibly reside in the entire skin. All the acephala, brachiopoda, cirrhopoda, and part of the gasteropoda and pteropoda are destitute of eyes. The cephalopoda, on the other hand, have them quite as complicated as those of warm-blooded animals; they also possess the peculiarity of being supplied with organs of hearing; and they are the only class in which the brain has been discovered to be enclosed in a particular cartilaginous box. Nearly all mollusks have, more or less, a development of the skin termed the mantle, as before stated, and this is often narrowed into a simple dish, formed into a pipe, hollowed into a sac, or extended and divided in the form of fins. The *naked mollusca* are those in which the mantle is simply membranous or fleshy; most frequently, however, it forms in its thickness one or several laminæ, of a substance which is more or less hard, and is deposited in layers, always increasing in extent as well as in thickness, because the recent layers always outedge the old ones. When this substance remains concealed in the thickness of the mantle, it is customary still to apply the term naked mollusca. Generally, however, it becomes so much developed that the animal, when contracted, can find shelter beneath it. In such a case it is then termed a *shell,* and the animal is said to be *testaceous.* The shells are various, and differ in form, colour, surface, substance, and brilliancy. Some are calcareous, while others are horny, and they always consist of matter deposited in layers, and exuded from the skin under the epidermis, like the enamel covering the nails, horns, scales, and teeth of other animals. Many modes of mastication and deglutition can be traced in the mollusca. Their stomachs are sometimes simple, at other times multiple, and frequently provided with a peculiar anatomy, while their intestines are variously prolonged. They commonly have salivary glands, and always a large liver, but neither pancreas nor mesentery; several, also, have secretions which are peculiar to themselves. Their modes of generation vary considerably. Several possess the faculty of self-impregnation; others, although hermaphrodites, have need of a reciprocal intercourse, while many, indeed, have the sexes distinct and separated. Some, again, are viviparous, others oviparous; the eggs of the latter are sometimes enveloped with a shell, more or less hard, but sometimes covered with a simple viscosity. These varieties of the digestive and generative processes are found in the same order, and sometimes in the same family. The mollusca, in general, appear to be animals that are but slightly developed, possessed of but little industry, and which are only preserved by their fecundity and vital tenacity. Mollusks convert nearly every substance, both animal and vegetable, into food, which some take in a decomposed state, while others will only eat such substances as are perfectly fresh. Some are terrestrial, while others inhabit only the sea and fresh waters: a few varieties are also amphibious; but this class is much restricted in number. The uses and advantages of mollusks are various. Some supply food to man, while others supply nutritive provender to birds and fishes. Their shelly coverings are also converted into useful articles of commerce, and the celebrated Tyrian dye of the ancients was made from the veins of different shells termed *purpura* by the Romans. The mollusks are divided into numerous classes, according to their structure; those possessed of a shell with one valve are termed univalve mollusca, and are furnished with a distinct head; from which circumstance they are called *encephalous*. These are divided into three classes, the first of which is termed,—1. *Cephalopoda*, or cuttle-fishes. These have their feet, or, strictly speaking, arms, attached to the head, forming a circle round the mouth. (*See* Cuttle-fish.)—2. The next class is the family Gasteropoda, or snails, which Cuvier divides into several orders or divisions, according to the structure of the gills; as the *Pulmonaria*, *Nudibranchiata*, *Inferobranchiata*, *Tectibranchiata*, *Heteropoda*, *Pectinibranchiata*, *Scutibranchiata*, and *Cyclobranchiata*.—3. The third class of the univalves is termed *Pteropoda*, which swim in the sea with a pair of fins that extend outwards from the sides of the head. The subdivision *Clio* of Linnæus, of this class, is the type of the whole: the family Pteropoda are mostly hermaphrodital. The *acephalous*, or bivalve mollusks, are divided into two classes,—1. the *Conchifera*, and secondly the *Brachiopoda*, both of which classes have been united into one order by later naturalists. The respiratory apparatus of these is externally situated, and is placed either between the mantle and the body in the form of plates, or in the substance of the mantle itself. Besides the several classes which have been catalogued, there is yet another, called the *Tunicata*, which are destitute both of head and shell. Cuvier, in his supplement to Mollusca, in his great work, says that the diseases of these animals are not very numerous, but yet very little is known about them; and he puts forward the query whether oysters in a state of greenness, as they are often observed to be, ought not to be regarded as unhealthy.—*Ref.* Cuvier's *Règne Animal*; Hoeven's *Handbook of Zoology*, &c. &c.

Mona, *moh'-nah*, one of the many monkeys belonging to the genus Cercopithecus, and sometimes called the variegated monkey, because its fur is varied with gray, red, brown, and green. It is often brought to Europe, and is easily tamed.

Monad, *mo'-năd*, (Gr. *monas*, a unit.)—In Nat. Hist., this term is given to the simplest kind of minute animalcules. In Metaphysics, the word, according to Leibnitz, is used to denote a simple substance, having no parts; a compound substance being an aggregate of simple substances or monads. The basis of the monadic theory lies in the various philosophical systems of Democritus, Zeno, and Epicurus. Leibnitz was the first to arrange the different theories in a system.

Mondjourou, *mond-joo-roo*, an Indian shrew, (*sorex murinus*,) sometimes called the Sondeli, or Indian musk-rat. It gives out a most powerful scent or musk, which is so powerful as to taint any food over which it has passed, and to render it uneatable.

Monk-bird. (*See* Friar-bird.)

Monitor, *mon'-e-tor*, (Lat., one who warns,) a genus of large lizards, having teeth in both jaws, and none on the palate. The greater part have the tail compressed laterally, as an adaptation to their aquatic habits. The first of the two distinct groups into which the genus is divided bears the name of Nilotic monitors, their chief characteristics being numerous small scales upon the head and limbs, and a keel above the tail, formed of a double range of projecting scales. The second group carries angular plates upon the head, whilst the body and tail carry large rectangular scales. The monitors are found in most parts of the world, and the fossil remains of species larger than any at present in existence have been discovered in Europe. Their name is said to be derived from their making a whistling sound as a warning of the approach of crocodiles and alligators, whose haunts the monitors frequent. This genus is also represented in Western Australia.

Monkey, *munk'-e*, (Ital. *monicchio*.)—In the article on Mammalia the reader will find that the larger section of the animal creation has been divided into various classes in a descending scale, from the highest animal, man, to the lowest group of the cetaceans or whale tribe. Ranking next to man are the Quadrumana, under which heading apes, baboons, gorillas, and monkeys are generally classed. As the other subdivisions have been already described in distinct articles, the present one will be only devoted to the consideration of the monkeys proper, whose technical characteristics will be found given under the article Simiadæ. The true monkeys, the *sapajous*, are only such as have prehensile tails, and are inhabitants of South America exclusively; but as the name has become extended in its signification, the monkeys of the whole world may as well be described at the same time. The monkeys form by far the largest portion of the Quadrumana. The *sapajous* are very active, climb well, and by the aid of their tail, which is as good as another hand, they can spring from tree to tree in the vast forests of South America with inconceivable rapidity and agility. The fore-hands, however, are not so perfectly organised as those belonging to the monkeys of Africa, the thumb being longer and more on a line with the other fingers. The facial angle of the *sapajous* is 60°, which forms a marked contrast to others of the species. They are small in size, and very playful. Foremost amongst them may be placed the weeper, (*Cebus Apella*.) Its fur is of a rich olive-colour, inclining to golden on the lighter parts. There is also the horned sapajou, (*Cebus fatuellus*,) the large-headed sapajou, (*Cebus monachus*,) and more than fifteen or sixteen other species. To turn to the monkeys of Asia and Africa, we find a great change in the generic character. The first variety is the spotted or Diana monkey, (*Cercopithecus Diana*,) a native of Congo and Guinea, and one of the most lively and playful of the whole tribe. It has a long white beard, and the upper parts of the body are of a reddish colour, marked with white specks, and the tail is about as long as the body. The Green monkey, (*Cercopithecus sabæus*,) is one of the most abundant of the group, and is oftener seen in a state of captivity. It is a native of the Cape de Verde Islands, and of the continent of Africa. In its disposition it approaches the long-armed apes, although it is more lively and playful. The colour is greenish-yellow above, arising from the hairs being arranged according to different shades of yellow and black; but the colour is more of a dark grizzled appearance on the sides of the body, and on the sides of the limbs, which becomes gradually darker towards the hands. The face, ears, and naked part of the hands, are of a jet-black; the former is of a triangular shape, bounded above the eyes by a straight line of stiff black hairs, and on the sides by spreading tufts of light hairs, with a yellowish tinge, meeting in a point beneath the chin. The neck and chest and the under parts of the body have a yellowish tinge, and the inside of the limbs is grayish in colour. The length of the head and body is about from sixteen to eighteen inches, while that of the tail is somewhat more. One of the most peculiar of the monkey class is the genus termed the Proboscis monkey, (*Nasua larvatus*,) which is distinguished by the extraordinary elongation of its nose, which gives it the most grotesque appearance. This nose is about four inches long; the body is unshapely, protruding in front, like the ourangs; the arms are of considerable proportionate length, like the gibbons; while, like the howling monkeys, it possesses a large guttural sac; the presence, also, of a very long tail and naked callosities, combine, with the protrusion of the nasal organ, to give the proboscis monkey the most eccentric and peculiar appearance of the whole tribe. It is about three feet in height, and is a native of the island of Borneo. The *Red monkey* may next be mentioned, as it is one of the oldest known to naturalists. It is a native of Senegal. The length of the body is about a foot and a half, or one foot four inches, while that of the tail is nearly equal. All the upper parts are of a brilliant reddish fawn-colour, which is shaded into a pale grayish tinge on the arms and legs, while the face, cheeks, breast, and under surface of the body are pure white; a band of black hair crosses above the eyebrows, and there are two lines of the same colour upon the upper lip, in the shape of a moustache, which tends to give this monkey a most peculiar appearance. The Entellus monkey (*Semnopithecus entellus* of F. Cuvier) is another variety; but it is little known in European collections. It is a native of the Indian archipelago, and of some parts of the Asiatic continent. According to Cuvier, the height of the Entellus monkey is generally about one foot five inches, and the length of the tail two feet. Another species, the Negro monkey, (*Semnopithecus maurus*,) is a native of Java and Sumatra; is somewhat larger than the variety last described; the length of the body being about two feet and a half, and that of the tail nearly equal. According to Doctor Horsfield's description, this class of monkey inhabits the extensive forests of the Spice Islands, and associates in numerous bands or societies, numbering more than fifty at a time, and is pursued by the natives for the sake of the fur. In these pursuits, which are regularly organised and prepared beforehand by the chiefs of the various tribes, the animals are attacked with cudgels and stones, and are destroyed in large numbers. The skins are then prepared by a simple process, which the natives learned from Europeans, and are exported. The fur is of a jet-black colour, covered with long silky hairs. The Simpai (*Semnopithecus melalophos* of F. Cuvier) is also a native of Java and Sumatra, and is remarkable from the flatness of the face, and the development of the facial angle. The last variety which can be mentioned in the present article is the White-eyelid monkey, (*Cercopithecus fuliginosus* of Geoffroy,) which is distinguished by the peculiar colour of the eyelids; they are of a clear grayish white, but with a dead chalky line. The hair is soft and fine to the touch, and in the upper parts is sooty black, which is even darker on the hands, but which generally shades into a yellowish tint on the breasts, belly, and inside of the thighs, and on these parts the thin coating of hair plainly shows the skin, which is of a very pure flesh-colour. (*See* also APE, GORILLA, BABOON, OURANG-OUTANG, QUADRUMANA, and SIMIADÆ.)

MONO. (*See* BRACHYTELES.)

MONODON. (*See* WHALE.)

MONSTER, *mon'-ster*, (Lat. *monstrum*,) in Phys., is applied to any creature whose formation deviates in some remarkable way from the usual formation of its kind.

MOONGUS, or MONGOOSE, *moon-gus*, one of the Ichnuemons belonging to India, (*Herpeste. griseus*,) of a gray colour, flecked with black It is very useful in destroying rats, mice, and various reptiles.

MOOR HEN. (*See* WATER HEN.)

MOORUK, *moor'-uck*, native name for a rare Cassowary, (*Casuarius bennettii*,) that was discovered in 1856 by Captain Deolin, in New Britain. It is easily tamed, and Dr Bennett, after whom it is named, has given a spirited description of its habits in his "Gatherings of a Naturalist in Australasia."

MOOSE-DEER. (*See* ELK.)

MORRHUA. (*See* COD.)

MORSE. (*See* SEAL and WALRUS.)

MOSQUITO, *mos-ke'-to*, a troublesome little insect, resembling the gnat, and belonging to the family Culicidæ: it is a native of the West Indies, the American continent, South Africa, and India. The common mosquito (*Culex Mosquito*) is about the same size as the gnat, and possesses a sucker, with five sharp-pointed needle-like organs, with which it pierces the skin and sucks the blood. The mosquito seldom appears in the day-time; but at night, in the tropics, they are exceedingly annoying.

MOTH, *moth*, (Sax. *mogthe*,) an insect belonging to the family Lepidoptera, which includes all diurnal and nocturnal moths and butterflies. Moths are seldom seen except in the evening and at night. As the scientific description of these insects will be found fully given under the articles INSECT-TRANSFORMATIONS and LEPIDOPTERA, it need not be here touched on; a few general remarks being more in keeping. The moths are well known for their habit of destroying clothing and furs, in which they can hardly be stopped, no matter what remedies are adopted; particularly in tropical climates. The *Tinea sarcitella* attacks woollen clothes; the *Tinea pellionella* furs; the *Tinea flavifrontella* damages collections of natural history, while the *Tinea granella* commits great havoc amongst corn and grain. The damages caused to clothes are, however, chiefly owing to the caterpillar, which begins to form a nest as soon as it has left the egg. In order to effect its object, it first spins a thin coating of silk round its body; it then cuts filaments of thread or cloth from the garment on which it has located itself, and applies the pieces to the outside of its case, which it never leaves until it has developed itself into a small nocturnal moth, of a silvery gray colour. Turpentine, camphor, and tobacco, will generally keep off these troublesome intruders. (*See* Lepidoptera, Apple-Moth, Tiger-Moth, Emperor-Moth, Death's-head, Hawk-Moth, &c.)

Mother-of-Pearl, *muth'-er*, the hard, lustrous, brilliant internal layer of shells, especially oyster shells, and more particularly the pearl oyster. In English oysters, this substance is too thin to be workable for manufacturing purposes; but the oysters of the Eastern seas yield it of considerable thickness. The brilliant hues of mother-of-pearl do not depend on the nature of the substance, but on an exquisitely fine series of furrows upon the surface, which produce this chromatic effect, according to the angle at which the light is reflected. In working this delicate substance great care is required; but it may be cut by saws, files, and drills, with the aid of sulphuric or muriatic acid. It is polished by colcothar, or the brown-red oxide of iron, left after the distillation of the acid from sulphate of iron. In all ornamental manufactures, where pearl is said to be used for flat surfaces, such as inlaying, mosaic-work, &c., it is not real pearl, but mother-of-pearl that is employed. Very large quantities are consumed in the manufacturing establishments of Birmingham and Sheffield. An instance has occurred of a ship arriving at London from Panama with more than two million pearl shells.

Motmots, *moh'-mohs*, a group of birds belonging to the genus Momotus, and inhabiting tropical America. They are believed to be allied to the Todies, and are very brilliantly coloured. Their average size is equal to that of the jackdaw.

Moufflon, *mu'-flon.*—This member of the sheep family belongs to Corsica and Sardinia, and is known generally by the designation *Ovis musimon.* It inhabits mountainous regions. The head is long, with the muzzle compressed and the nose somewhat raised; the horns of the males are large and long, and triangular, bending with an arch, which constitutes more than half a circle; the ears are moderately large, and are erect and acute; the general tint of the body is yellow, tending to a chestnut or ash-colour, which is deepest on the neck and lighter on several parts of the back and under-surface of the body. The moufflon is provided with long hair, besides wool, and it is to this hair that the gradations of colour are due. The female is distinguished from the male by the absence of horns. The moufflons are very gregarious, going about in herds composed of more than a hundred, which herds are generally placed under the leadership of some old and courageous male. As they have few enemies but men, they multiply considerably, and populate the mountains of the islands of Corsica and Sardinia, where they are principally found.

Mount St Bernard Dog, *mownt-saint-ber'-nard,* termed the Alpine spaniel in the arrangement of Cuvier, presents the characters of a breed between the Newfoundland dog and mastiff, and is well known from the fact of its being employed by the charitable houses of monks in the Alps to rescue travellers who have been buried in the snow, or have lost their way amongst the mountainous regions around them. The Mount St Bernard dogs are characterised as possessing nearly a larger amount of sagacity, approaching to reason, than any of the varieties of the canine race. Although the unfortunate traveller whom they go out to rescue may lie fifteen or twenty feet beneath the snow, yet these animals at once take up the scent, and scratch away at the snow, all the time continuing a hoarse bark, which can be heard more than a mile distant, and which brings the monks to the rescue. In an anecdote related in the "Library of Entertaining Information," it is mentioned that one of the Mount St Bernard dogs was decorated with a medal for having saved the lives of twenty-two persons. This dog died in the year 1816, in a vain attempt to convey a poor traveller to the convent; but his memory is still kept up in the recollection of the Alpine guides, who have never forgotten his faithful services. There is another variety which performs nearly as useful services, and which is more strictly allied to the Molossian breed—it is termed the smooth Alpine spaniel. (*See* Dog.)

Mouse. (*See* Mice.)

Mouth, *mowth*, (Sax. *muth*,) the aperture in the head of an animal by which he utters his voice and receives his food. In a more general sense, the mouth consists of the lips, the gums, the insides of the cheeks, the palate, the salival glands, the uvula, and tonsils.

Mucous Membrane, *mu'-kus*, (Lat.,) in Anat., is the membraneous substance which lines all those internal passages and cavities of the body which are exposed to contact with the air, or by which foreign substances are taken into the body or eliminated from it. These membranes are soft, velvety, and extremely vascular. They are distinguished as lining the digestive, respiratory, and genito-urinary passages. In each of these parts they present some slight modifications, adapted for special functions.

Mucus, (Lat.,) in Anat., is a thick viscid substance, secreted by the various mucous surfaces of the body. All secretions poured upon mucous membranes are more or less mingled with mucus, as the saliva, urine, &c. Its principal office is to protect the mucous surfaces from injury by the contact of foreign substances, and to lubricate the several passages. In certain parts it has special functions; as that of the nose, which is favourable to smell; that of the stomach and intestines, aiding digestion. Its properties are variously altered by disease; becoming acid, mixed with pus, or otherwise changed.

Mud-burrowers, a popular name for Crustaceans, belonging to the genus Callianassa. They have the abdomen long, the integuments soft, and the carapace very small in proportion to the tail. They are marine animals, and burrow into the mud, making holes of two feet or more in depth.

Mule, *mule*, (Sp. and Ital., *mulo*,) an animal which is a hybrid between the horse and the ass. It has a large clumsy head, erect ears, a short stiff mane, and a thin tail. Those mules which are produced by a male ass and a mare are by far the best, and they are highly valued in Spain, Portugal, Italy, in the East, and in Spanish America, where their sure-footedness and general adaptability for carrying large burdens, make them of great utility in crossing mountains, &c. The Roman ladies of old used to have their coaches drawn by mules, and in the present day they are used for the same purpose in Spain, which latter country produces by far the best breed, although those from Savoy are larger. Mules are much hardier than the horse, are cheaper to keep, have fewer diseases, and will live and work twice as long.

Mullet, *mul'-let*, (Fr. *mulet*,)—The common mullet or gray mullet, (*Mugil capito* of Cuvier,) is the type of a family of acanthopterygious fishes, termed Mugilidæ, to which it necessarily belongs. Its generic characters are as follows:—Body nearly cylindrical, covered with large scales; two dorsal fins, widely separated, the rays of the first fin being spinous, and those of the second flexible; ventral fins behind the pectorals; the middle of the under jaw with an elevated angular point, and a corresponding groove to receive it in the upper; the teeth small; the head depressed; and the branchiostegous rays six in number. The colour of the back and top of the head is a dusky gray, tinged with blue; the sides and under-surface of the body silvery white, marked with longitudinal parallel dark lines; the membranes of the fins dull white, cheeks silvery white, and the irides reddish brown. The gray mullet seldom proceeds to any distance from land, as it delights in shallow water, and often proceeds to some distance up the mouths of rivers. It is found in large numbers in Cornwall and Devonshire, and, in fact, along the whole line of our south coast. That the gray mullet was well known to the ancients, the historian Pliny bears ample testimony, as he has celebrated the great fisheries of this one species which the Romans possessed at Languedoc. The mullets prey generally on food in a state of decomposition, and it is one of the few fishes that reject live prey. Besides the common mullet, there are several other varieties, as specified in Baron Cuvier's "Règne Animal." There is the Thick-lipped Gray mullet, which differs only from the specimen last described by the lip being thicker, and the colour of the head and back being more of a greenish hue. The Plain Red mullet, found in the Mediterranean and the seas and rivers of America, Africa, and even India; and the Stripped Red mullet, which is also found distributed as above, may be enumerated among the mullets, but they belong more properly to the family Percidæ. These are smaller in size than the gray mullet, and, although some specimens have been caught, are not often seen on our coasts.

Mullingong. (*See* Duckbill.)

Munga. One of the names of the Bonnet Monkey.

Mureena, *mew-reen'-ah*, a fish allied to the eels, and sometimes confounded with the lamprey. Its flesh is very delicate, and was exceedingly valued by the ancient epicures, who would give the most extravagant sums to procure a large and fat specimen.

Muscicapa. (*See* Fly-catchers.)

Muscidæ. An order of dipterous insects. The common house and blue-bottle flies belong to it.

Muscle, *mus'-l*, (Lat. *musculus*,) in Anat., is a term applied to the fibrous contracticle tissue forming the flesh of men and animals, by means of which the many highly complicated voluntary and involuntary motions of the body are performed. Muscular tissue is of two kinds, distinguished by structural peculiarities and mode of action, the one including the muscles of organic life, (with the exception of the fibres of the heart,) consisting of simple smooth filaments; the other comprising the muscles of animal life and the heart, and consisting of compound and apparently striated fibres, or tubes enclosing fibrils. The muscles of organic life, or unstriped muscles, consist of fibres, or, rather, elongated spindle-shaped fibre-cells, which, in their most perfect form, are from 1-2700th to 1-3100th of an inch broad, very clear, granular, and brittle, many of them being marked along the middle or one of the edges either by a fine continuous dark streak, or by short isolated dark points. These fibres are collected in divers numbers in fasciculi, and form the proper contractile coats of the digestive canal, urinary bladder, gall-bladder, arteries, &c. The muscles of animal life, or striped muscles, are composed of fleshy bundles enclosed in coverings of fibro-cellular tissue, by which each is at once connected with, and isolated from, those adjacent to it. Each bundle is again divided into smaller ones similarly ensheathed, and similarly divisible through an uncertain number of gradations, till just beyond the reach of the naked eye one arrives at the primitive fasciculi, or the muscular fibres properly so called. These consist of tubes of delicate structureless membrane,—the *sarcolemma* of Bowman, varying in breadth from 1-200th to 1-500th of an inch, and inclosing a number of filaments. They are of a pale yellow colour, and marked by striæ which pass transversely round them. The primitive fibrils, of which each fasciculus contains several hundreds, are the proper contractile tissue of the muscle, cylindrical but somewhat flattened in form, and about 1-18000ths of an inch in greatest thickness. The peculiar property of muscular tissue, its contractility, although commonly brought into action by the nervous system, appears to be inherent in the muscular tissue, and not derived by it from the nerves, for it may be manifested in a muscle after being isolated from the influence of the nervous system by division of the nerves supplying it. Muscular contraction is generally believed to be effected by an approximation of the constituent parts of the fibrils, which, without any alteration in their general direction, become closer, flatter, and wider. It is a uniform, simultaneous, and steady shortening of each fibre and its contents. Muscles are usually styled voluntary or involuntary, according as they are, or are not, subject to the influence of the will; but this division is not strictly accurate, and is of little value in a scientific point of view. Many muscles, especially such as are under the immediate dominance of reflex nervous action, (as the respiratory and sphincter muscles,) partake of both characters; since volition can interfere only temporarily with their contraction; and all muscles, even the most confessedly voluntary, are subject to emotional and instinctive influences, in which the will has no share. Muscles are either elongated and fixed at their two extremities, or hollow and enclosing a cavity. They are so disposed as to give beauty as well as strength to the human body, and for the most part are arranged in pairs; as flexors and extensors, abductors and adductors, supinators and pronators, &c. Muscles are attached to bones by means of tendons, white and shining, rounded or flattened, fibrous cords, and very resisting. The fixed point of a muscle is called its origin, the moveable one its insertion. Muscular fibres, especially those of animal life, are constantly in a state of slight contraction, as is evident from the fact that when the action of certain muscles of a part are injured, the antagonistic muscles always draw it towards them. Thus, when the muscles of one lateral half of the face are paralyzed, those of the other half draw the features towards their side, so that the healthy side of the face is that which exhibits the unsightly contortions. There are in the human body no fewer than 527 distinct muscles, of which 261 are in pairs, and 5 single on the median line. Of these there are 83 in the head and face, the *orbicularis oris* being single; 49 in the neck, the arytenoid of the larynx being single; 78 in the thorax, the *triangularis sterni* and the diaphragm being single; 33 in the abdomen, the *sphincter ani* being single; 78 in the back, 98 in the upper extremities, and 108 in the lower. Yet with all this complicated machinery, everything is in perfect order and harmony.

Muscovy Duck, *mus'-ko-ve*, (*Cairina moschata*,) a bird which obtains its name, not, as might be supposed, from the fact of its being a native of Russia, but on account of the strong musky smell with which it is imbued, and properly called the musk-duck. It is sometimes upwards of two feet in length, and its plumage is usually black, with glosses of green and blue. The muscovy ducks are much more prolific than other species of the family, and their eggs are larger, and are tinged with a greenish hue.—(*See* also Ducks.)

Musk, *musk*, (Fr. *musc*,) a peculiar aromatic substance, found in a sac, or small bag, which hangs from the abdomen of a small male quadruped of the deer kind, which inhabits Tonquin and Thibet. In colour, musk is blackish-brown; it is lumpy or granular, somewhat like dried blood, with which substance indeed it is often adulterated. The only criterion of its genuineness is the intensity of its smell. It loses its odour when thoroughly dried, but regains it when moistened with liquid ammonia. The variety most esteemed is that of Tonquin; it comes to this country in small bags covered with a reddish-brown hair. All the analyses of musk hitherto made teach little or nothing concerning its essential or active constituents. It is used in medicine, and, when taken in the dose of a few grains, rouses the energy of the digestive organs, and soon afterwards produces sympathetic phenomena, the powers of the whole animal system appearing suddenly increased. Other effects also prove that it acts on the brain, spinal chord, and ganglionic nerves; such as tendency to sleep, convulsive movements, and particularly spasms of the chest and abdomen. Musk, on account of idiosyncrasies, produces very extraordinary effects in some persons; in certain individuals these are so violent that they cannot bear the slightest odour of the substance. In 1857, 10,728 ounces of musk were imported into this country.

Musk-Beetle, (*Cerambyx moschatus*,) a coleopterous insect, belonging to the family Cerambycidæ and the group Longicornes. The musk-beetle possesses a peculiar scent,—not at all like musk, however, but more like attar of roses. This scent is supposed to attract the male, as it is stronger in the female than in the former. It is found generally on willows in the south of England. The pretty green tiger-beetle, *Cicindela campestus*, possesses an odour as penetrating as that of the musk-beetle, but more resembling the fragrance of a verbena leaf when rubbed. It is sometimes called the small musk-beetle, or the tiger musk-beetle.

Musk-Cavy, a species of Capromys, a genus of animals belonging to the class Mammalia, order Rodentia or Glires, and family Muridæ. It is about the size of a rabbit or hare, and is exclusively herbivorous. The musk-cavy is so called from the feet of it emitting a strong perfume of musk. It burrows under ground like the mole, and can be thus traced merely by its scent. It is a native of the West-India islands, in some of which it is called by the natives the *manacou*.

Musk-Deer, (*Moschus moschiferus*,) a tribe of ruminant animals belonging to the family *Bovidæ*, and distinguished from the Cervinæ by the absence of horns and the presence of long canine teeth in the upper jaw. A pouch containing a secretion, termed musk, is placed under the abdomen of the males of some of the species. (*See* Musk.) The following description is taken from Baird's Cyclopædia:—The animals belonging to this tribe are small and very swift, and elegant in their movements; but little of their habits is known. They are confined to the Old World. The true musk deer, (*Moschus*,) is the most celebrated of all the tribe, but at the same time is one of whose habits we know the least. It is about the size and form of a roebuck, is a shy and timid creature, and inhabits the mountainous regions of Asia, as Thibet and the upper provinces of China. The musk pouch is peculiar to the male, and is about three inches in diameter. The best musk is obtained from Thibet.

Musk-Ox, (*Ovibos moschatus*,) an animal belonging to the family Bovæa. It inhabits the barren lands of North America that lie above the 60th degree of latitude. When full grown, the size of the animal is nearly equal to that of the Highland bullock, although rather shorter in the legs. Sir William Jardine gives an excellent account of this animal. He says, "The horns are very broad, covering the brow and whole crown of the head, and touching each other for their whole breadth from before backwards. The head is large and broad. There is no vestige of a naked muzzle, the end of the nose, middle part of the upper lip, and a great part of the lower, being covered with a close coat of short white hairs. The remainder of the head anterior to the horns is covered with very dark umber-brown hair, long and bushy towards the root of the nose. The eyes are moderately large. The general colour of the hair on the body is brown, on the neck and between the shoulders long, matted, and somewhat curled; on the back and hips it is also long, but lies smoothly. . . . . The tail is so short as to be concealed by the fur of the hips. The cow differs from the male in being of a less size, having smaller horns, not touching at the base, and with shorter hair on the chest and throat."—(Sir William Jardine, in *Naturalist's Library*, vols. ix., x.) It may be added in conclusion, that the musk-ox is of a far more placid temper than other members of the family Bovæa, but it will attack an assailant if wounded. It generally perceives its enemies by means of its sense of smell, which is very fully developed. It has been termed the *musk-ox* in consequence of its flesh, although very palatable for eating, smelling very strongly of musk.

MUSK-RAT. (*See* MUSQUASH.)

MUSOPHAGA. (*See* PLANTAIN-EATER.)

MUSQUASH, *musk'-wash*, a genus of rodent Mammalia, belonging to the family Castoridæ, termed variously *musquash*, *musk beaver*, or *musk-rat*. It is a native of North America, and in its appearance and habits resembles considerably the beaver. It is hunted for its skin, which is much adopted in the manufacture of hats; upwards of a million skins being imported into this country annually. It is sometimes called the Ondatra.—*Ref.* Baird's *Cyclopædia of the Natural Sciences.*

MUSQUAW, *musk'-waw*, a name for the common black bear of North America.

MUSSEL, *mus'-sl*, (*Mytilus edulis*, Linn,) a well-known mollusk, which is used among the lower class as a species of food, but which is more commonly consumed as bait by fishermen. The shells are ovate-triangular, with a marginal cartilage, and sometimes one or two undeveloped teeth under the umbo. The common mussel is very abundant both in this country and in the Mediterranean, as well as in the North Sea. They frequent mud-banks. It is stated in "A History of British Mollusca and their Shells," by Professor Forbes and Mr Hanley, that about 400,000 mussels are consumed annually in Edinburgh and Leith, as an article of food, and 4,320,000 for bait. Besides the common mussels, there are also the Horn mussels, distinguished from the former by their habit of digging and burrowing in the sands; besides several other varieties too numerous to mention individually.

MUSTANG, *mus-tang'*, name for the horses that run wild in the prairies of America. They are descended from horses imported by the Spaniards.

MUSTELA. (*See* WEASEL.)

MYCETES. (*See* HOWLER, URSIVE.)

MYCTERIA. (*See* JABIRU.)

MYGALE. (*See* ARACHNIDEÆ.)

MYLODON, *mi'-lo-don*, (Gr. *mule*, a mill; *odous*, a tooth,) a gigantic fossil quadruped included under the family of extinct Edentata, by Owen called the *Megathoridæ*. The mylodon is closely allied to the Megatherium, and among existing Edentata it holds a place between the ai and the great armadillo. Its food is said to have chiefly consisted of the leaves and tender shoots of forest trees, which the animal's gigantic strength enabled it to tear up by the roots. There have been three distinct species described,—*M. robustus*, *M. Darwinii*, *M. Harlani*. In 1841, an almost complete skeleton of *M. robustus* was discovered about twenty miles north of Buenos Ayres. This specimen is preserved in the museum of the Royal College of Surgeons.

MYODES. (*See* LEMMING.)

MYOXUS. (*See* LEROT.)

MYRIAPODA, *me-re-pă'-o-dă*, (Gr. *muria*, ten thousand; *podes*, feet,) usually designated by the term Centipedes, have been classed by Cuvier in the first order of insects. They are the only animals of the order which possess more than six feet in their perfect state, and which have their abdomen not distinct from their trunk. Their body, destitute of wings, is composed of a number of rings, generally equal in size; each of which—a few of the first excepted—bears two pairs of feet, mostly terminated by a single hook; these annuli, or rings, are either entire or divided into two demi-segments, each bearing a pair of these organs, and one of these only exhibiting two stigmata. In general, the Myriapoda resemble little serpents or nereides, their feet being closely approximated to each other throughout the whole extent of the body. The form of these organs even extends to the parts of the mouth. The mandibles are bi-articulated, and immediately followed by a quadruple piece in the form of a lip, with articulated divisions resembling little feet, which, from its position, corresponds to the ligula of the crustacea. Next come two pairs of little feet, the second of which, in several, resemble large hooks, that appear to replace the two jaws as well as the lower lip of insects. The antennæ are two in number, and are short, somewhat thicker towards the extremity, or nearly filiform, and composed of seven joints in some: in others they are numerous and setaceous. Their visual organs are usually composed of a union of ocelli. The stigmata are very small, and their number, owing to that of the annuli, is usually greater than in the latter, where it never exceeds eighteen or twenty. The Myriapoda are divided into two families by Cuvier; namely, the *Chilognatha*, and the *Chilopoda;* the first of which move very slowly, that is, slide along, and roll themselves into a ball; while the latter possess speedier faculties of locomotion. The Chilognatha are divided by Linnæus into four classes; viz., *Glomeris*, *Iulus*, *Polydesmus*, and *Polyxenus*. The Chilopoda are divided into three classes: comprising *Scutigera*, *Lithobius*, and *Scolipendra*. (*See* also CENTIPEDE.)

MYRMECOBIUS, *mir-mee-koh'-by-us*, a remarkable marsupial animal of Australia, which has no less than fifty-two teeth. It looks something like a squirrel, and is extremely active among trees. Although belonging to the marsupials, it has no true pouch, the long hairs of the abdomen answering the same purpose.

MYRMECOPHAGA. (*See* ANT-EATERS.)

MYRMELEON. (*See* ANT-LION.)

MYRTLE-BIRD, a bird belonging to the Sylvicolidæ, a genus of the dentirostral tribe of the order Passeres. It has a beak extremely straight and slender, and sharp-pointed, with the upper mandible notched toward the point. As the myrtle-birds are somewhat migratory in their habits, they pass from one part of the country to another, according to the seasons. Their food consists of insects and soft fruits, and they are natives of the United States of America. The plumage of this species is black and yellow, spotted with white, and the bird is between five and six inches long.

MYTILUS. (*See* MUSSEL.)

MYXINE, *mix'-ine*, a remarkable fish allied to the lampreys, and remarkable for exuding a vast amount of glutinous substance. It is predacious, and will even eat the bodies of fishes that are suspended on the hook. The cod fishermen suffer greatly from its attacks, and in consequence of its habit, call it the glutinous hog-fish. Several will penetrate simultaneously into the body of a single fish. Its scientific name is *myxine glutinosa*.

N.

Nails, in Nat. Hist., are the appendages to the fingers and toes of human beings and the quadrumana, which correspond with the claws and hoofs of other animals. The nails are an altered form of the epidermis or outward layer of the skin. Under the microscope, a portion of newly-formed nail is found to consist almost entirely of nucleated cells, which are of exactly the same character as those found in the new layers of epidermal tissue. No distinct structure can be observed as the nail grows older, but when immersed in a weak solution of caustic potash or soda, the cells become visible. The nails of a human being are produced from a fold in the true skin, which has a highly vascular surface, furnished with longitudinal elevated ridges, to which blood-vessels are copiously distributed, and between which the soft inner layer of the nail drops down. The growth of the nail is caused by additions to its base; but as it moves, it also receives additional matter from the skin, on which it rests. According to M. Beau, the condition of the nails may be made subservient to the diagnosis of disease. When a nail is injured, it is speedily reproduced, except when the skin beneath has been destroyed.

Nakoo, *nah-koo'*, native name for the Gaviol or Gangetic crocodile, *q.v.*

Nandine, *nan-deen'*, a pretty animal, allied to the Ichneumon, and remarkable for the double row of spots along the body.

Napu, *nah'-poo*, a little musk-producing deer, inhabiting Java and Sumatra.

Narwhal. (*See* Whale.)

Nasua. (*See* Monkey.)

Natatores, *nă-tă-to'-reez*, (from *nato*, I swim,) a name applied in Nat. Hist. to such birds as are web-footed, and otherwise adapted to lead an aquatic life. The order includes no less than five different families, which may be here mentioned; namely, the *Anatidæ*, or ducks; the *Colymbidæ*, or divers; the *Alcidæ*, or auks; the *Laridæ*, or gulls; and the *Pelicanidæ*, or pelicans; all of which will be found fully described under their different headings. Birds of this class vary greatly both in the size of their wings and powers of flight, and they are all easily distinguishable from the rest of the feathered tribes, on account of the peculiar structure of their feet, which are invariably webbed. A thick coat of down also covers the bodies of *natatores* beneath their plumage, and an oily secretion covers the feathers, and saves them from getting wet.

Natterjack, *nat'-tur-jak*, a species of toad, which is found in some parts of England. It may be easily known by the yellow line along the back and the dark bands on the hind legs.

Natural History, in its extended signification, is that science which investigates the descriptions and peculiarities of all bodies belonging to nature that we can see; but the term is generally restricted to the external description of objects of nature, whether vegetable, animal, or mineral. It is consequently divided into three separate headings:—1. *Geology* and *Mineralogy;* 2. *Botany;* and 3. *Zoology*. Natural history is indebted to Aristotle for its first organisation; and since the days of that philosopher, many and vast improvements have been made in the various branches of the science. Lord Bacon was one of those who did much for natural history, and following in his steps came Gesner, Aldrovandi, Ray, Tournefort, and, greatest of all, Linnæus. Buffon and Cuvier also improved the science, and Professor Owen of the present day likewise enlarged the theories on the subject; thus natural history, in its present development, may be said to be as nearly perfect as possible. The reader will find the subject fully treated under articles Botany, &c. &c.

Nautilus, *naw'-te-lus*, (Gr. *nautilos*, from *naus*, a ship.)—This mollusk, belonging to the family Cephalopoda, and termed Argonauta by Linnæus, is remarkable for the shape of its shell, and the peculiar method it has of progression, by means of drawing water into the body, and then ejecting it forcibly through the siphon. While passing through the water, all the tentacles are trailed behind, so as to afford little resistance. The two membranous tentacles which were ever thought to be used as sails, are wrapped over the shell, and conceal the greater part of its surface. If the sea becomes rough, or it perceives any danger, the nautilus withdraws all its arms, concentrates itself into its shell, and sinks to the bottom. The body of the animal does not adhere to the spirals with which its shell is plentifully convolved, and some authors have affirmed that it is a parasite; but as it is always found in the same shell, and as no other animal has been ever found therein, this assertion is highly problematical. The most common species is the *Nautilus pompilius*, which is a native of the Indian seas, especially about the Molucca islands. (*See* also Mollusca.) And the Paper Nautilus is often used as an ornament in consequence of its beautiful shape and delicate texture.

Neck, *nek*, (Sax. *necca*,) in Anat., is that part of the body which connects the head with the trunk. It is principally made up of the cervical vertebræ, and the numerous muscles which cover them, and are concerned in their different movements, and in those of the head and shoulders. The pharynx and œsophagus lie in contact with the front of the vertebral column, and the larynx and trachea in front of these. The large blood-vessels of the head pass through the neck on the front of the spine, and some important nerves take nearly the same course. These several organs, connected together rather loosely by cellular substance and surrounded by integuments, compose the neck.

Nectarinia, *nek-tah rin'-ny-a*, a genus of birds, intermediate between the creepers and the humming birds. They are usually called sun birds, and represent in the old world the humming birds of the new. They are slender, swift-winged, lightly coloured, and have long and delicate beaks, and are often mistaken for humming birds. There are many species of sun bird found in Asia, Africa, Java, and other countries of the old world.

Nemocera, *ne-mos'-e-ră*, (Gr. *nema*, a thread, and *keras*, a horn,) a class of dipterous insects, including those which have long filiform antennæ. In this family, the antennæ usually consist of from fourteen to sixteen points. They are either filiform or setaceous, frequently hairy, particularly in the males, and much longer than the head. The body is elongated, the head small and rounded, the eyes large, the proboscis salient, and either short and terminated by two large lips, or prolonged into a siphon-like tube, with two exterior palpi inserted at its base, usually filiform or setaceous, and composed of four or five joints. the thorax is thick and elevated, the wings are oblong; the halteres are entirely exposed, and are apparently accompanied with alatæ, (little wings.) The abdomen is elongated, and most commonly formed of nine annuli; it terminates in a point in the female, but is thicker at the end, and furnished with hooks in the males. The legs are very long and slender, and are frequently used as instruments by which the insects can balance themselves. They are found at nearly every season of the year, and usually flit together in the air in numbers. The larvæ are always elongated, and resemble worms. They have a large head, and a mouth furnished with parts analogous to maxillæ and lips. They always change their skin to become nymphs. The latter, sometimes naked and sometimes enclosed in cocoons constructed by the larvæ, approximate in their figure to the perfect insect; they also present the external organs, and complete their metamorphosis in the usual manner. They have frequently, near the head, or on the thorax, two organs of respiration, resembling tubes. The family Nemocera is composed of the genera *Culex* and *Tipula* of Linnæus. (*See* MOSQUITO.)

NENNOOK, native name for the polar bear, *q.v.*

NEOTRAGUS. (*See* MADOQUA.)

NEPA. (*See* SCORPION, WATER.)

NEREIS, *nee′-ree-is*, a genus of marine worms, remarkable for the double row of oars or bristles on the sides of the body. Under the microscope they are seen to be shaped like bundles of spears, scimitars, and other weapons. The Nereis is very common on our coasts.

NERVES. (*See* NERVOUS SYSTEM.)

NERVOUS SYSTEM, in Anat. and Physiol., embraces that portion of the organism of man by which the mind is brought into connexion with the physical world. The nervous system consists of two portions or constituent systems, —the cerebro-spinal and the sympathetic or ganglionic. The cerebro-spinal system includes the brain and spinal cord, with the nerves proceeding from them, and is denominated by Bichat the nervous system of animal life. It includes those nervous organs in and through which are performed the several functions with which the mind is more immediately connected, as those relating to sensation and volition. The sympathetic or ganglionic system, named by Bichat the nervous system of organic life, consists of a chain of ganglia extending from the cranium to the pelvis along each side of the vertebral column, and from which nerves with ganglia proceed to the viscera in the thoracic, abdominal, and pelvic cavities. (*See* GANGLION.) The several organs of the nervous system are composed of two different substances, which differ from each other in density, colour, minute structure, and chemical composition. They are the vesicular-nervous and the fibrous-nervous matter, the former being also called the gray or cineritious substance, the latter the white or medullary. The former is distinguished by its dark reddish-gray colour and soft consistence, and is found usually collected in masses and mingled with fibrous structure, as in the brain, spinal cord, and the several ganglia, but never in the nerves. The masses constitute what are termed nervous centres, being the organs in which it is supposed that nervous force may be generated, and in which are accomplished all the various reflections and other modes of disposing of impressions when they are not simply conducted along nerve-fibres. The fibrous nerve-substance, besides entering into the composition of the nervous centres, forms alone the nerves or cords of communication which connect the various nervous centres with the different tissues and organs. The vesicular nervous substance is composed, as its name implies, of vesicles or corpuscles, commonly called nerve or ganglion corpuscles, containing nuclei and nucleoli; the vesicles being imbedded either in a finely granular substance, as in the brain, or in a capsule of nucleated cells, as in the ganglia. Each vesicle consists of an exceedingly delicate membranous wall enclosing a finely granular material, part of which is occasionally of a coarser kind, and of a reddish or yellowish-brown colour. The nucleus is vesicular, much smaller than the vesicle, and adherent to some part of its anterior. The nucleolus, which is enclosed within the nucleus, is vesicular in form, of minute size, and peculiarly clear and brilliant. The nerve-corpuscles vary in shape and size; some are small, spherical, or ovoidal, with an uninterrupted outline. The fibrous-nervous matter consists of two different kinds of nerve-fibres, which are distinguished as the tubular fibre and the gelatinous fibre. In most nerves these two kinds are intermingled, the tubular fibres being more numerous in the nerves of the cerebro-spinal system, the gelatinous predominating in the nerves of the sympathetic system. The nerve-fibres vary in size, being largest within the trunk and branches of the nerves, where they measure from 1-2000th to 1-3000th of an inch, and becoming gradually smaller as they approach the brain and spinal cord, and usually, also, in the tissues in which they are distributed. In the gray matter of the brain and spinal cord they seldom measure more than 1-10,000th to 1-14,000th of an inch. The tubular fibres, in a perfectly fresh state, present the appearance of simple membranous tubes, perfectly cylindrical, and containing the proper nerve-substance, a transparent oil-like and apparently homogeneous material, but which, shortly after death, undergoes a change, and has the appearance of being composed of two different materials; the internal or central part, occupying the axis of the tube, becomes grayish, while the outer or cortical portion becomes opaque, and dimly granular or grumous, as if from a kind of coagulation. The gelatinous fibres constitute the main part of the trunk and branches of the sympathetic nerve, and are intermingled in various proportions in the cerebro-spinal nerves. They are flattened, soft, and homogeneous in appearance, and when collected together in great numbers, they present a yellowish-gray colour. They differ from the tubular fibres in being only one-half or one-third of their size, in the absence of the double contour, their apparently uniform structure, and their yellowish-gray colour. The nerves are divided into two great classes,—the cerebro-spinal which proceed from the cerebro-spinal axis, and are the nerves of animal life, being distributed to the organs of the senses, the skin, and the muscles; and the sympathetic or ganglionic nerves, which proceed from the ganglia of the sympathetic, and are distributed chiefly to the viscera and blood-vessels, and are termed the nerves of organic life. The cerebro-spinal nerves consist almost exclusively of the tubular nerve-fibres, the gelatinous fibres existing only in very small proportion. Each cerebro-spinal nerve consists of numerous nerve-fibres collected together and enclosed in a membranous sheath. A small bundle of primitive fibres so enclosed is called a *funculus*; and if the nerve is of small size, it may consist only of a single funculus; but if large, the funculi are collected together into larger bundles or fasciculi, and are bound together in a common membranous investment termed the sheath. Nerves, in their course, subdivide into branches, and these frequently communicate with the branches of a neighbouring nerve; but in these communications the nerve-fibres never coalesce, but merely pass into the sheath of the adjacent nerve, become intermixed with the nerve-fibres, and again pass on to become blended with the nerve-fibres in some adjoining fasciculus. Every nerve-fibre in its course proceeds uninterruptedly from its origin at a nervous centre to its destination; and however long its course, there is no branching or anastomosis, or union with the substance of any other fibres. The communications which take place between two or more nerves form what is called a *plexus*, in which the component nerves divide, then join, and again subdivide in such a complex manner that the individual fasciculi become most intricately interlaced. As the small bundles of nerve-fibres approach their final and minutest distribution in the several tissues, they commonly form delicate "terminal plexuses." The primitive fibres appear to terminate in various ways, as in loops, in plexuses, by branching, by free ends. The central termination of a nerve-fibre is that in connexion with a nerve-centre; the peripheral termination, that in connexion with the different organs and tissues. The sympathetic nerve consists of tubular and gelatinous fibres intermixed with a varying proportion of filamentous areolar tissue, and enclosed in a sheath of fibro-areolar tissue. The tubular fibres are for the most part smaller than those composing the cerebro-spinal nerves, and their double contour is less distinct. The nerve-fibres both of the cerebro-spinal and sympathetic system convey impressions of a twofold kind,—the one the impressions made upon their peripheral extremities or parts of their course conveyed to the nervous centres, the other the impressions from the brain and other nervous centres to the parts to which the nerves are distributed. For this twofold office two distinct sets of nerve-fibres are provided,—the sensitive, called also the centripetal or afferent nerves, which convey impressions from the periphery to the centre; and the motor, centrifugal, or efferent nerves, which transmit central impulses to the muscles, &c. But with this difference in the functions of the nerves, there is no apparent difference in the structure of the nerve-fibres by which it might be explained. Nerve-fibres appear to possess no power of generating force in themselves, or of originating impulses to action; but they possess a certain property of conducting impressions, but which is never manifested till some stimulus is applied. This property of nerves is called excitability, irritability, or nervous force, and one of its peculiarities is the rapidity with which it travels along the nerve-fibres. In many respects it resembles electricity, but the analogy between the two does not amount to identity. Almost all things that can disturb the nerves from their passive state, act as stimuli, and produce the same kind of effect, though not the same in degree, because that on which they act possesses but one kind of excitable force. All stimuli, internal or external, chemical, mechanical, or electrical, when applied to sensitive nerves, produce sensations, and when applied to motor nerves, excite contractions. There are certain kinds of nerves, however, the irritation of which produces effects that are entirely peculiar to themselves; thus, irritation of the optic nerves causes the sensation of light; of the auditory nerve, of sound; and of the olfactory or gustatory nerves, of smell and taste. It is a remarkable fact, that whatever part of a sensitive nerve be irritated, whether it be the centre, middle, or extremity, the same sensation will be produced. (*See* BRAIN, SPINAL CORD, GANGLION.)—Ref. *Quain's Anatomy*, by Sharpey; Gray's *Anatomy*; Kirke's *Physiology*; Carpenter's *Human Physiology*; Todd's *Cyclopædia of Anatomy and Physiology*; Brown-Sequard's *Physiology of the Nervous System*.

NEST. (*See* BIRDS.)

NESTOR. (*See* COCKATOOS.)

NEUROPTERA, *nu-rop'-te-ră*, (Gr. *neuron*, a nerve, and *pteron*, a wing,) one of the great classes into which the insect world is divided. It comprises the *Dragon-flies*, *May-flies*, *Termites*, *Lacewing-flies*, *Scorpion-flies*, and *Ant-Lions*. The *Neuroptera* are distinguished by their two upper wings, which are membranous, generally naked, diaphanous, and similar to the under ones in texture and properties; they are also distinguished by the number of these organs, as well as by their mouth, which is either fitted for mastication or else furnished with mandibles and true maxillæ. The abdomen is destitute of a sting, and is merely furnished with an ovipositer. Their antennæ are usually setaceous, and composed of numerous joints. They have two or three simple eyes, and the trunk is formed of three segments united in a single body, distinct from the abdomen, and bearing six legs; the first of these segments is usually very short, and in the form of a collar. The number of joints in the tarsi varies. The body is usually elongated, and with rather soft, or with slightly squamous teguments; the abdomen is always sessile. Many of these insects are carnivorous in their first state and in their last. Some merely experience a semi-metamorphosis, the rest a complete one; but the larvæ have generally six hooked feet, which they employ to reach their food. Cuvier divides the neuropterans into four different varieties, which he characterises as follows:—1. Carnivorous insects subject to a semi-metamorphosis, with aquatic larvæ; 2. carnivorous insects subject to a complete metamorphosis, with either aquatic or terrestrial larvæ; 3. carnivorous or omnivorous terrestrial insects, subject to a semi-metamorphosis; 4. herbivorous insects subject to a complete metamorphosis, with aquatic larvæ that construct portable dwellings. The first family is termed the *Subulicornes*, composed of the order *Odenata* of Fabricius, and of the genus *Ephemera*, (*which see.*) The second family is composed of the *Planipennes*, composed of the genera *Panorpidæ* of Latreille; and the *Plicipennes*, formed of the genera *Phryganea* of Linnæus, belong to the third family. (*See* DRAGON-FLY, EPHEMERA, MAY-FLY, &c.)

NEWFOUNDLAND DOG, *nu'-found-lănd*, a well-known and splendid variety of the canine race, remarkable for its strength, nobility of character, sagacity, and attachment to its master. There is no doubt that this dog derived its origin from the large Spanish dogs which were introduced into America by the early discoverers; and that from thence it was brought over to Europe. The natives of Newfoundland made them draw sledges and carts, and put them to other degrading uses. The rigours of the climate, and the difficulty of procuring food for the dogs, were, however, unfavourable both to the production of numbers and the full development of the frame. The English variety has been so cultivated that it is widely different, both in shape, size, and appearance, from the original stock, which is now extinct in Newfoundland. Many anecdotes are related of the Newfoundland dog's courage in saving lives, so much so that he is esteemed one of the most honourable members of the Humane Society. The following anecdote with regard to his intelligence is extracted from Jesse's "Anecdotes of Dogs:"—A gentleman of Suffolk on an excursion with his friend, was attended by a Newfoundland dog, which soon became the subject of conversation. The master, after a warm eulogium upon the perfections of his canine favourite, assured his companion that he would, upon receiving the order, return and fetch any article he should leave behind, from any distance. To confirm this assertion, a marked shilling was put under a large square stone by the side of the road, being first shown to the dog. The gentleman then rode on for three miles, when the dog received the signal from his master to return for the shilling he had been seen to put under the stone. The dog turned back; the gentlemen rode on and reached home; but to their surprise and disappointment, the hitherto faithful messenger did not return during the day. It afterwards appeared that he had gone to the place where the shilling was deposited, but the stone being too large for his strength to remove, he had stayed howling at the place till two horsemen riding by, and attracted by his seeming distress, stopped to look at him, when one of them alighting, removed the stone, and seeing the shilling, put it in his pocket, not at the time conceiving it to be the object of the dog's search. The dog followed their horses for twenty miles to an inn where they stopped, remained undisturbed in the room where they supped, followed the chambermaid into their bedchamber, and secreted himself under one of the beds. The possessor of the shilling hung his trousers upon a nail by the bedside; but when the travellers were both asleep, the dog took them in his mouth, and leaping out of the window, which was left open on account of the heat, reached the house of his master at four o'clock in the morning with the prize he had made free with, in the pockets of which were found, besides the marked shilling, a watch and money, that were returned upon being advertised, when the whole mystery was soon unravelled, to the admiration of all the parties. The Newfoundland dog is, in temper, as generous as he is brave, and never tyrannises over dogs smaller than himself.

NEWT, *nute*, a small batrachian, of which there are many species, the principal one being termed the great water-newt, (*Triton palustris.*) This specimen, when it is full grown, measures about six inches in length, and in its appearance greatly resembles the salamander, (*which see.*) On the back the colour is a dark brown; the sides are speckled with spots, and the under-surface of the body is a bright orange, variegated with black patches. The head is rather small, and the eyes are of a bright golden hue; the tail is flattened in form, and has thin edges at the extremities; and the limbs are short, the fore-feet being divided into four, and the hind into five toes. The newt inhabits shady places and stagnant water, and lives principally on insects, of which it consumes an immense quantity. Besides the great water-newt there is the common water-newt, (*Triton aquaticus,*) which, in its habits and appearance, so closely resembles the former, as not to need a distinct description.

NIGHTINGALE, *nite'-in-gail* (from Sax. *night*, and *galan*, to sing,) (*Philomela luscinia,*) a well-known British songster, which, for its talents, is unequalled by any other specimen of the feathered tribe. Its generic characters may be thus briefly described:—Bill of moderate length, straight, upper ridge rounded; the tip of the upper mandible being slightly deflected and emarginated. The nostrils basal, lateral, round, and pierced in a membrane. The wings of moderate size; the tail slightly rounded; the legs long; the toes of moderate length; and the claws rather short. The nightingale usually makes its appearance in this country about the middle of April, and the males arrive before the females. It frequents the market-gardens about London, and is found also in Sussex, Kent, Hampshire, Dorsetshire, and the eastern part of Devonshire, along the south coast. It also migrates as far north as Russia and Sweden. The beak is brown; the irides hazel; the head and all the upper parts of the body and wings of a uniform brown colour, tinged with a reddish chestnut; all the under parts dull grayish-white in colour; the chin and the lower part of the breast of a lighter tint than the throat and chest; while the under tail coverts are a pale reddish-white; and the legs, toes, and claws are brown. The whole length of the bird is about six inches and three-eighths, according to Mr Yarrell. Isaac Walton remarks on its power of song in the following expressive language:—"But the nightingale, another of my airy creatures, breathes such sweet loud music out of her little instrumental throat, that it might make mankind to think that miracles are not ceased. He that at midnight, when the very labourers sleep securely, should hear, as I have very often, the clear airs, the sweet descants, the natural rising and falling, the doubling and re-doubling of her voice, might well be lifted above earth, and say, 'Lord, what music hast thou provided for the saints in heaven, when thou affordest bad men such music on earth?'"—*Ref.* Yarrell's *History of British Birds.*

NIGHTJAR. (*See* GOATSUCKERS.)

Nirmus, *nur'-mus*, a genus of parasitic arachnida, popularly called "ticks," which are found on many creatures, both furred and feathered.

Noble. (*See* Lyrie.)

Noctiluca, *nok-tĭ-loo'-ka*, a tiny marine creature to which is owing much of the luminosity of the sea. It is round, scarcely as large as a minikin pin's head, and is furnished with a short and slender tail-like process, by which it is driven through the water. It is thought to belong to the Rhizopoda, *q. v.*

Noctule, *nok-tule*, one of the largest of the British bats, (*Noctulinia altivolans.*) It loves to fly at a great height, and when chasing prey, utters a succession of shrill and piercing shrieks.

Noddy, *nod'-di*, a species of Tern, (*Anöus stolidus*,) which has earned its name through its habit of perching on ships and allowing itself to be caught by the hand.

Nose, *noze*, (Sax. *næse*, *nosa*,) is the organ of smell in vertebrated animals, and in the three highest classes is connected with the respiratory function. In man, the nose forms one of the characteristic features of the face, and has been regarded by physiognomists as a faithful index of character. The nose has always been regarded as a principal element in conferring beauty on the face; but different races have differed greatly as to what form of this organ is to be regarded as the most beautiful. The ancients seem to have had an aversion to small noses; and the Romans esteemed above all the aquiline nose, which Pliny termed, by way of distinction, "royal." According to Plutarch, Cyrus had this form of nose, which thus came to be regarded as beautiful among the Persians. But the aquiline nose was only regarded as beautiful when the curve was gentle and almost imperceptible. The Greeks indeed seem, generally speaking, to have held a straight, or almost straight, line from the forehead to be the *beau idéal* with respect to this feature; and, accordingly, we find it so represented in all their best statues. The short nose is never to be found in Roman sculpture earlier than the times of Caracalla, when the art had evidently declined. In Tartary, the greatest beauties are those who have the smallest noses; and the wife of Genghis Khan is said to have been regarded as an extraordinary beauty, because she had only two holes for a nose. In literature, the term nose is used in a variety of different senses; as, to lead by the nose, to pass under one's nose, to have a nose for errors, to thrust one's nose into the affairs of others, to put one's nose out of joint, &c. The nose, anatomically considered, consists of two large cavities, called nostrils, (*nares*,) a right and a left, formed by the bones of the face, and separated from each other by a perpendicular flat partition called the *septum narium*. There are fourteen bones which enter into the composition of the cavities of the nose; the principal of which are the nasal bones, which bound the nasal cavities in front, and are attached to the frontal bone above and to the superior maxillary on the sides. The other bones of the nose are the frontal, ethmoid, and sphenoid, which are common to the head and face; and all the bones of the face, excepting the two malar and inferior maxillary; being the two superior maxillary, two lachrymal, two inferior spongy, the vomer, and the two palatal bones. The septum of the nose is formed by the vomer, nasal lamella of the ethmoid bone, and an extensive cartilage. The nasal cavities are bounded anteriorly by the nasal bones, superiorly by the frontal bone and the cribriform plate of the ethmoid bone, and posteriorly by the body of the sphenoid. The floor is formed by the superior maxillary and palatal bones, and the outer wall by the ethmoid, the internal pterygoid plates of the sphenoid bone, the lachrymal bone, inferior spongy bone, palatal bone, and superior maxillary. Each nostril is divided by the spongy bone into chambers, termed the *superior*, *middle*, and *inferior meatus*. The openings into these, in addition to the anterior and posterior common openings, are as follows:—In the inferior meatus, the opening from the nasal duct, concealed by a fold of mucous membrane; in the middle meatus, one from the maxillary sinus, one from the frontal sinus, and anterior ethmoidal cells; in the superior meatus, the opening from the posterior ethmoidal cells and sphenoidal sinuses, and the spheno-palatine foramen. The Eustachian tube might almost be said to enter the nostrils, for its anterior aperture corresponds with the posterior part of the inferior spongy bone. The upper wall of the nose is pierced by numerous foramina, through which enter the filaments of the olfactory, or nerve of smell. The mucous membrane lining the nose is called the *Schneiderian*, or *pituitary*, and is continuous with the common integument anteriorly and with the mucous membrane of the pharynx posteriorly. It is, for the most part, well supplied with vessels, especially veins, and presents also numerous glandular follicles, whose secretion is well known. It receives the filaments of the nerves of smell and of common sensation. The nerves of smell arise from the anterior lobes of the cerebral hemispheres, and their bulbs rest on the cribriform plate of the ethmoid bone, which the branches pierce, to the number of fifteen or twenty, on each side, and then, running under the mucous membrane, are distributed principally to the septum and outer wall of the nose, communicating with filaments from the sympathetic cerebral ganglia. Besides smell, the nose has ordinary sensation, like other parts of the face, depending on filaments of the trifacial or fifth pair of cerebral nerves. That those two sensations are distinct is evident from those who have lost the sense of smell still retaining unimpaired susceptibility to the action of snuff and other irritants. The openings of the nose are provided with stiff curved hairs, which prevent the entrance of many particles floating in the air. The external prominent part of the nose, which gives character to the feature, is composed of several cartilages connected to the bones and to each other by strong fibrous tissue, sufficiently firm to preserve the shape of the organ, and so elastic and flexible as to permit the expansion and contraction of the nostrils in respiration. The varying expression given to the face by the movements of the nose depends on the action of its muscles attached to the cartilages, skin, and upper lip; and most of the expressions arising from these movements are disagreeable; indicating contempt, anger, fear, or pain. The motor nerves of the nasal muscles are branches of the facial or seventh pair of cerebral nerves. The arteries are derived from the ophthalmic, internal maxillary, and facial branches of the carotids. The nose is not only the organ of smelling, but serves also as the chief passage of the air into the lungs, and has a considerable influence upon the voice.

Nucifraga. (*See* Nutcracker.)

Nucleobranchiata, *new-kle-ŏ-bran-ki-ai'-ta*, an order of marine molluscs in which the gills are collected into a mass on the hinder portion of the back. They belong to the following section.

Nudibranchiata, *new-di-bran-ki-ai'-ta*, a section of marine molluscs in which the gills are external and placed on the back and sides of the body.

Numenius. (*See* Whimbrel Curler.)

Numida. (*See* Guinea Fowl.)

Nutcracker, *nut-kra'k-er*, a small species of crow (*Nucifraga caryocatactes*) which feeds upon nuts, mast, fir-seeds, and other fruits. It is beautifully marked with elongated white spots on a darker ground.

Nuthatch, *nu't-hatch*, a small bird allied to the creepers, and remarkable for its habit of breaking nuts by repeated blows of its powerful beak. It always feeds upon insects which it finds under the bark. Its scientific name is *Sitta Europœa.*

Nyctibius. (*See* Ibigau.)

Nycticebus. (*See* Kukang.)

Nyctipicecus. (*See* Douroucouli.)

Nylghau, *nil-gaw*, or white-footed antelope, *Antilope picta*, is found in Northern India and the borders of Persia, where it frequents the vast jungles which cover those regions, and it is one of the largest and finest antelopes there. It is dark gray, that colour being composed of thin coats of hair,—black, brownish, and white. The horns are seven or eight inches long, and are curved forwards. The legs, which, like the head, are darker in colour than the body, are commonly marked by a transverse white mark in front, and by a second patch opposite the accessory hoofs on the inner side. The females are of a fawn-colour, are less in size than the males, and are deprived of horns. The nylghau is hunted in the usual manner in which game is taken in the East, by surrounding them in fences, or with nets, and killing them at pleasure.—*Ref.* Sir William Jardine, in the *Naturalist's Library.*

O.

Occiput. (*See* Brain, Anatomy.)

Ocelot, *o'-se-lot*, (Fr.,) (*Felis pardalis* of Linnæus,) a group of the feline tribe, which is slightly smaller than the ounce. The general characteristics of the class being stated under the article Felidæ, (*which see*,) the mere description of the animal need only here be given. Like the jaguar, the ocelot is subject to considerable variety in the form and distribution of the markings of its coat; but, nevertheless, the colouring is always chaste and the assemblage harmonious; the rich red of the ground tint blending finely with the deep brown, or almost black colour, of the borders of the spots. The length of a full-grown ocelot is from three feet and a half to four feet, including its tail, which is between eleven and fifteen inches. Specimens of it have been brought from Mexico, Brazil, Guiana, and Surinam, where it inhabits the forest and climbs trees in search of its prey, which consists of birds and small animals. The *linked ocelot* (*Felis catenata*) is another species, which differs from the first from its size being only that of a wild cat, and that its markings are more extended, as they are like lengthened spots with an open centre. The *long-tailed ocelot* (*Felis macrourus*) is another species, and is characterised by the length of its tail.

Octopus. (*See* Cuttle-fish.)

Œsophagus, *e-sof'-ă-gus* (Gr. *phero*, (*oiso*,) I carry, and *phago*, I eat,) in Anat., is the gullet, or the membranous tube leading from the pharynx to the stomach, and forming the passage through which the food descends into the latter organ. It commences at the cricoid cartilage, opposite the fifth cervical vertebra, and, descending along the front of the spine, passes through the diaphragm opposite the ninth dorsal vertebra, and there ends by opening into the cardiac orifice of the stomach. Its length is about nine inches, and its direction nearly straight, having only two or three slight curvatures. Its walls are composed of three coats,—an external or muscular, a middle or areolar, and an internal or mucous coat. In the neck, the œsophagus lies immediately behind the trachea

Œstus. (*See* Gadflies.)

Oikŭticus, *oy-ket'-ĭk-us*, a genus of moths, called House-builders, because the caterpillars make long, movable cases of leaves and stems, and dwell within them. The female insect never leaves her home, but the male flies abroad in search of a mate. They are found in the West Indies.

Oil-beetle, a well-known British insect, (*Melöe violaceus*,) allied to the Blister-fly, and remarkable for pouring an oily secretion from the joints of its legs, whenever it is alarmed.

Opah, *o'h-pa*, a handsome British marine fish, sometimes called the King-fish, (*Lampris luna.*) It is allied to the John Dory, and is beautifully coloured with purple, green, scarlet, and gold.

Ophidia. (*See* Snakes.)

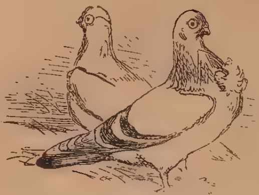
Ophiocephalus, *o-fi-o-ke'f-ăl-us*, a snake-like fish of the East Indies, properly called the Cora-mota, or Gachua. It can live a very long time out of the water, and will survive the cruelest wounds for many hours.

Ophisaurus. (*See* Glass-snakes.)

Opisthobranchiæ, *o-pis-tho-bra'nk-i-ee*, a group of marine molluscs, in which the gills are set on the hinder part of the body.

Opisthocomus. (*See* Hoatzin.)

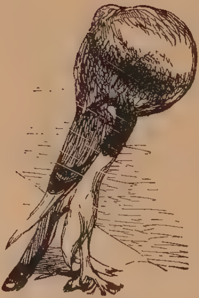
Opossum, *o-pos'-sum*, (*Didelphis*,) an animal belonging to the family of Mammalia in the animal kingdom, and its section Marsupialia, and it is a native of the American continent. The opossum is characterised by having ten cutting-teeth above, eight below, and a prehensile tail, besides the peculiar characteristics of the order to which it belongs. (*See* Marsupialia.) The Virginian opossum (*Didelphis virginiana*) is one of the best examples of the tribe, and it may be thus described. The length of its head and body taken together is about 22 inches, and of its tail 15 inches; its fur is long and woolly, with very long hairs interspersed with that on the upper surface of the body; the general colour is dirty white, tinged with a slight yellowish hue; the legs are dusky brown; the eyes are surrounded with the same tint; hair on the upper parts of the body, of a deep brown, or blackish at the tip; the ears are large and naked, and are marked with white at the tip. This opossum is one of



OWL PIGEONS.

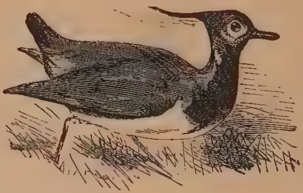
TURBIT PIGEONS.

MAGNIFICENT.



POUTER PIGEON.

PLAICE.



PLOVER.

PIKE.

the largest species of the genus, and its form is robust, the head very large, and the fur long and woolly. It inhabits North America, and is found from Mexico to the southern provinces, inhabiting principally the states of Virginia, Louisiana, Mexico, and even Brazil and Peru. It is very destructive to poultry, and sucks the blood while eating the flesh, according to Pennant. It also feeds on roots and wild fruits, in the pursuit of which it is very active in climbing trees, from the branches of which it hangs suspended by its prehensile tail, swinging its body, which enables it to throw itself into the branches of neighbouring trees. When pursued and overtaken, the opossum will often feign itself dead, in order by this stratagem thus to escape its enemies. When first born, the young are blind, naked, and shapeless, and scarcely more than a grain in weight, and fasten themselves to the teats in the pouch, to which they continue adhered until fifty days, when they, being now about the size of mice, drop again into the pouch, but return to the teats when they require food. During this time, the female shows great affection for her young, and will rather suffer death than allow her pouch to be opened. The flesh of the old animals is good, its flavour somewhat resembling that of a sucking-pig; but the skin has a very fetid odour. Besides the Virginian opossum, there are the Crab eating opossum, and many others.

ORANG OUTANG. (*See* OURANG-OUTANG.)

OREOCEPHALUS, *o-re o-ke'f-ăl-us*, a large and curious lizard found in the Salapagos Islands. This animal lives on the coast, and climbs or swims with equal ease. It is a formidable looking creature, its head being covered with spikes and its back with spines, and its feet armed with sharp and curved claws. It is about three feet in length.

OREOTRAGUS. (*See* KLIFFSPRINGER.)

ORGGIA. (*See* VAPOURER MOTH.)

ORINER, *o'r-iner*, a large marine univalve shell, belonging to the genus *Haliotes*, and common in the Channel Islands. It is sometimes called the Sea-ear.

ORIOLE, *or'-e-ole*, (*Icterus*,) a group of birds common in America, and which are, according to the naturalist Wilson, closely allied to the family of the starlings, (*Sturnus;*) indeed he calls the orioles generally "red-winged starlings." The Baltimore oriole (*Icterus Baltimore*) may be selected as the typical variety of the family. The male is of an orange-colour, with the head, neck, upper part of the back, and greater portion of the wings, black. It passes its time during the winter in South America, but during the spring it makes its appearance in the States, where its arrival is hailed as the harbinger of summer. Their principal food consists of caterpillars, bulbs, and bugs, particularly of one of a glossy green, which, Wilson observes, he often found in their stomachs. Their song is a clear whistle, repeated at short intervals; when alarmed, they give vent to a kind of a rapid chirp, very different from their usual note. The Baltimore oriole is full of life and activity, and is constantly seen vaulting amongst the branches of trees, and flitting about in the bright sunshine, its orange plumage bringing it out in strong relief against the green foliage. One of the most peculiar characteristics of this bird is the manner in which it builds its nest, the structure of which consists of a pendulous cylindrical pouch of six or seven inches in depth, usually suspended from the extremity of some lofty branch which has a drooping inclination. The materials of which this nest is composed are wool, cow-hair, flax, and hemp, which are woven into a complete cloth, the whole sewn strongly through and through with long horse-hairs, several of which measure two feet in length. The bottom is principally of cow-hair, also sewn strongly with horse-hair. So solicitous indeed are these birds for good materials, that the women in the country have to watch their thread, clothes, &c., to prevent the orioles from carrying them off. Besides the Baltimore oriole, there is the *red-winged starling*, (*Sturnus prœditorius* of Wilson,) which is one of the greatest robbers of grain-fields of all similar birds in America. It is found in Virginia, North and South Carolina, Georgia, and Louisiana, in winter, in the vicinity of the large rice and corn fields. In the spring it migrates to the Northern States, where it breeds. The red-winged starling is about nine inches long and fourteen in extent, and its general colour is a glossy black, with the exception of the wing-coverts, which are of a brilliant scarlet.

ORNITHOLOGY, *or-ni-thol'-o-je*, (Gr. *ornis*, a bird, and *logos*, a discourse,) is that department of natural history which treats on all departments of science connected with the feathered race. In the article BIRDS, some slight ornithological sketch has been given, along with a description of the habits, &c., of the members of this branch of natural history; consequently, it is only needed, under the present heading, to characterise the important divisions and subdivisions into which the class *Aves* has been divided. According to the Linnæan system, there are six orders; viz.,—I. *Accipitres*, or *birds of prey*, which have the bill more or less curved, the upper mandible armed with a tooth-like process near the tip, and the feet short and robust, with strong hooked claws. II. *Picæ*, having the bill straight on one side and curved on the other, and the feet short and strong. III. *Anseres*, or web-footed water-fowl, the characteristics of which are:—Bill smooth, covered with an epidermis, and short at the tip; the toes united with a web, and the legs short and thick. IV. *Grallæ*, waders, or shore birds, the bills of which are cylindrical, and the feet long, and bare above the tarsus, being formed for wading. V. *Gallinæ;* under which name are comprised poultry and other gallinaceous birds. The bill is convex, the upper mandible curved over the lower, and the nostrils arched, with a cartilaginous membrane. The feet have the toes separated and are rough beneath. VI. *Passeres*, the bills of which are conical and sharp-pointed, the feet slender, and the toes separated, being formed principally for perching. In the subdivisions of these, the *first order*, *Accipitres*, contains the genus *Vultur*, or Vultures, of which there are eight separate species: the characteristics are a hooked beak and the head bare. Secondly, there is the genus *Falco*, which comprises all eagles and hawks; the beak is also hooked, but the head is feathered: of the falcons there are thirty-two distinct species. Thirdly, we have the genus *Strix*, or Owls, of which there are twelve species. The beak of these is also hooked, and the feathers at its base directed outwards. Lastly, there is the genus *Lanius*, or Shrikes, of which we have twenty-six species; the beak is notched and nearly straight, but not quite so.—The *second order* (*Picæ*) has many subdivisions, of which the first is the genus *Psittacus*, or Parrots: the beak is hooked, and the upper mandible furnished with a sere: there are forty-seven species. Next comes the genus *Ramphastes*, or Toucans: the beak is very large, hollow, convex, and serrated; both mandibles incurved at the tip; and there are eight species. The next we come to are termed *Buceros*, or Hornbills, which have the beak convex, curved, cultrate, large and serrated, and the forehead covered by a horny plate: of these there are four species. The *Buphaga*, or Beef-eaters, come in the next succession; their beak is straight, and the mandibles bulge out: of this genus there is but one species. The *Crotophaga*, Plantain-eaters, form the next genus: the beak is compressed and arched; and there are two species. The following genus is termed *Corvus*, comprising the Crows: their beak is convex and cultrate, the nostrils covered by recumbent bristly feathers: of these there are nineteen varieties. The genus *Coracius*, or Rollers, follow next: their beak is conical, convex, straight, and acute, the upper mandible being slightly larger than the lower, and indistinctly notched: of these there are twenty species. The *Gracula*, or Grackles, have the beak cultrate, convex, and slightly bare at the base: of these there are eight species. The *Paradisea*, or Birds of Paradise, have the beak covered with the downy feathers of the forehead; the feathers at the sides are long; and there are several species. The genus *Trogon* has the beak shorter than the head, cultrate, hooked, and serrated: there are three species. The genus *Bucco*, or Barbets, have the beak cultrate, laterally compressed, notched at the tip, incurved, and opening to just beneath the eyes: of this class there is but one species. The Cuckoos (*Cuculus*) have the beak roundish; and there are twenty-two species. The Wrynecks (*Yunx*) have the beak roundish and sharp-pointed; the nostrils are concave, and there is but one species. The Woodpeckers (*Picus*) have the beak angular, straight, and the tip wedge-shaped; the nostrils being covered with recumbent bristly feathers: there are twenty-one species. The Nuthatches (*Sitta*) have the beak awl-shaped, roundish, and straight: there are three species. The Kingfishers (*Alcedo*) have the beak three-cornered, short, strong, acute, and long. The family *Todus* have the beak awl-shaped, a little flattened, obtuse, and straight, with spreading bristles at the base: there are two species. The Bee-eaters (*Merops*) have the beak curved and compressed: there are seven species. The Hoopoes (*Upupa*) have the beak arcuate, convex, a little compressed, and rather obtuse: there are three species. The Creepers (*Certhia*) have the beak arcuate, slender, and acute: there are twenty-five species. Lastly, the genus *Trochilus*, comprising the Humming-birds, have the beak slender, longer than the head, and its tip tubular: of these there are twenty-two species.—The *third order* (*Anseres*) contains fewer subdivisions than the one last described. In the first place there is the genus *Anas*, comprising swans, geese, and ducks. The beak is lamellated at the margin, and is convex and obtuse: there are forty-five species. The genus *Mergus*, the Mergansers, have the beak denticular, cylindrical, and the tip hooked: there are six species. The Auks (*Alca*) have the beak short, compressed, convex, and furrowed, the lower mandible having a prominent angle: of these there are five species. Next come the Petrels (*Procellaria*) which have the beak a little compressed; the upper mandible being hooked, and the lower channelled and compressed at the tip: there are six species. The Albatrosses (*Diomedea*) have the beak straight; the upper mandible hooked at the tip, and the lower one abrupt: there are two species. The Pelicans (*Pelicanus*) (under which head also are enumerated Solan geese and cormorants) have the beak straight, with its tip hooked and unguiculate: there are eight species. The Darters (*Plotus*) have the beak straight, sharp-pointed, and denticulated: there is but one species. The Tropic birds (*Phaeton*) have the beak cultrate and straight: there are two species. The Divers (*Colymbus*) have the beak slender, straight, and sharp-pointed: there are eleven species. The Gulls (*Larus*) have the beak straight, cultrate, and the tip slightly hooked, the lower mandible having an angular prominence: there are eleven species. The Terns, or Sea-swallows, (*Sterna*,) have the beak slender, nearly straight, acute, and compressed: there are seven species. Lastly, the Skimmers (*Rynchops*) have the beak straight, the upper mandible being much shorter than the lower, which is abruptly terminated.—The *fourth order* (*Grallæ*) contains nearly as many divisions as the second. First of these is placed the Flamingoes, (gen. *Phœnicopterus*,) which have the beak incurvated, as if broken, and denticulate; the feet are webbed, and there is but one species. (2.) The Spoonbills (*Platalea*) have the beak flattish, the tip dilated, rounded, and flat: there are three species. (3.) The Screamers (*Palamedea*) have the beak conical, the upper mandible being hooked: there are two species. (4.) *Mycteria*, Jabiru, (a species of stork,) has the beak acute, lower mandible trigonal and ascending; upper mandible three-cornered and straight: one species. (5.) *Cancroma*, Boat-bills, have the beak bulging, the upper mandible resembling a boat with the keel uppermost: two species. (6.) *Ardea*, Herons and Cranes, have the beak straight, acute, long, and a little compressed, with a furrow from the nostrils to the tip: twenty-six species. (7.) *Tantalus*, the Ibis, has the beak long, slender, and arcuate: there are seven species. (8.) *Scolopax*, Snipes and Curlews, have the beak long, slender, and obtuse; the face is feathered, and there are eighteen species. (9.) *Tringa*, Sandpipers, or Shore-larks, have the beak roundish, and as long as the head; nostrils linear, and feet with four toes: twenty-three species. (10.) *Charadrius*, Plovers, have the beak roundish and obtuse; feet with three toes: twelve species. (11.) *Recurvirostra*, Avocets, have the beak slender, recurved, and pointed, with the tip flexible: one species. (12.) *Hæmatopus*, Oyster-catchers, have the beak compressed, and the tip wedge-shaped: one species. (13.) *Fulica*, Coots, have the beak convex; upper mandible arched over the lower, which has a prominent angle: seven species. (14.) *Parra*, Jacanas, have the beak roundish and rather blunt; forehead vaulted, and wings spurred: five species. (15.) *Rallus*, Rails, have the beak shorter at the base, compressed, and acute: ten species. (16.) *Psophia*, Trumpeter, has one species; the beak is conical, convex, and rather sharp, the upper mandible exceeding the lower in length. (17.) *Otis*, or Bustards, have the beak with the upper mandible arched: five species. Lastly, (18.) *Struthio*, including the Ostrich and Cassowary, has the beak somewhat conical, and the wings unfitted for flying: there are three species.—Next in consideration comes the *fifth* order, *Gallinæ*. The first genus is termed *Didus:* the beak is contracted in the middle, with two transverse rugæ; the tip of both mandibles bent inwards: but one species, which is now extinct. (2.) *Pavo*, Peafowl, have the head covered with feathers, those of the rump elongated, with eye-like spots on the entire plumage: three species. (3.) *Meleagris*, Turkeys, have the head covered with spongy caruncles; the throat with a longitudinal membranous wattle: three species. (4.) *Crax*, Curassoes, have the beak with a sere at the base; head covered with recurved feathers: five species. (5.) *Phasianus*, Pheasants and domestic fowls, have the sides of the head bare: six species. (6.) *Numida*, Guinea-fowls, have carunculated wattles on each side of the face; head with a horny crest: one species. (7.) *Tetrao*, Grouse and Partridges, have bare papillæ near the eyes: twenty species.—The last order (*Passeres*) contains twelve classes. (1.) *Columba*, Pigeons, have the beak straight; nostrils with a tumid membrane: forty species. (2.) *Alauda*, Larks, have the beak slender and pointed; tongue slit; hind claws very long: eleven species. (3.) *Sturnus*, Starlings, have the beak slender, pointed, and flattened towards the point: five species. (4.) *Turdus*, Thrushes, have the beak subulate, compressed, and notched: seven species. (5.) *Ampelis*, Chatterers, have the beak awl-shaped, depressed at the base and notched: seven species. (6.) *Loxia*, including Grossbeaks, Bullfinches, &c., beak conical, and bulging at the base: forty-eight species. (7.) *Emberiza*, Buntings, have the beak somewhat conical, and lower mandibles broader than the upper: twenty-four species. (8.) *Tanagra*, Tanagers, have the beak notched, awl-shaped, and conical at the base: twenty-one species. (9.) *Motacilla*, Wagtails and Warblers, have the beak awl-shaped, tongue jagged, claw of the hind toe of moderate length: forty-nine species. (10.) *Pipra*, Manakins, have the beak awl-shaped, and the feathers at its base directed outwards; tongue abrupt: fourteen species. (11.) *Hirundo*, Swallows, have the beak very small, depressed at the base, and incurved; the mouth wider than the head: twelve species. Lastly, (12.) *Caprimulgus*, or Goatsuckers, have the beak very small, incurved, and depressed at its base; large bristles; the mouth very wide: two species.—It will be seen by the above catalogue that, according to the Linnæan system, the amount of different species in his classification exceeds nine hundred. The anatomical description of the feathered race will be found fully given under the article BIRDS, and therefore need not be here touched upon, and for a more detailed account of the various classes, the reader must consult the various articles on different birds in the present work; as EAGLE, &c. Some of the best works on the subject are Bewick's *British Birds;* Audubon's *Ornithological Biography;* Selby's *Illustrations of British Ornithology;* Macgilvray's *Rapacious Birds of Great Britain;* Yarrell's *History of British Birds*, and many other authors of note.—Ref. *Encyclopædia Britannica.*

ORTHOPTERA, *or-thop'-te-ră*, (Gr. *orthos*, straight, and *pteron*, a wing,) an order of insects which include all such as have their wings, when at rest, deposed in straight longitudinal folds. The orthoptera undergo a semi-metamorphosis, of which all the mutations are reduced to the growth and development of the elytra and wings, which are always visible in a rudimental state in the nymph; and, as both the nymph and the larva are otherwise exactly similar to the perfect insect, they walk and feed in the same manner. The mouth of the orthoptera consists of a labrum, two mandibles, as many maxillæ, and four palpi; those of the jaws always have five joints, whilst the labials, as in the coleoptera, (*which see*,) present but three. The mandibles are always very strong and horny, and the ligula is constantly divided into two or four thongs. The form of the antennæ also varies less than in the coleoptera, but they are usually composed of a larger number of joints. Several have two or three smaller eyes besides the reticulated ones. The inferior surface of the first joint of the tarsi is frequently fleshy or membranous. They have a first membranous stomach or crop, followed by a muscular gizzard, armed internally with horny teeth or scales, according to the species. All known members of this family are terrestrial. Some are carnivorous or omnivorous, but the greater number feed on living plants. The species that belong to Europe produce but once a year, and this takes place at the end of summer, which period also marks their final transformation. The orthoptera are divided by Cuvier into two sub-families:—1. The *Cursoria*, which have their legs formed for running, as the cockroaches; and 2. The *Saltatoria*, which have their legs formed for jumping or leaping, as the grasshoppers and locusts.—*Ref.* Cuvier's *Animal Kingdom.*

ORTOLAN, *or'-to-lăn*, (Ital. *ortolano*,) *Emberiza hortulana*, an insessorial bird, a native of the south of Europe, where, as a delicacy, it is much esteemed in the gastronomic calendar. The ortolan is about six inches in length. Its plumage is yellow on the throat and back, and the upper part of the body brown based with black, the under part being of a reddish bay-colour. The manner in which it is preserved is rather peculiar. In Italy and the south of France, it is fattened with millet-seed and other grain, in a room from which the sun is excluded, but which is lighted up by lamps, which are kept constantly burning. By these means the birds become mere lumps of fat, when they are packed in casks containing about four hundred, and preserved with spices and vinegar. Four hundred of these casks, it is said, are generally exported annually to all parts of Europe.

ORYX. (*See* GEMSBOK.)

OSMERUS. (*See* SWELT.)

OSPREY, *os'-pre*, (Lat. *ossifraga*, the bone-breaker,) (*Pandion haliaëtus*,) one of the most numerous species of the Raptores, or birds of prey, and one which is more widely diffused over the face of the globe than any other. It belongs to the Falconidæ, and its generic characters are as follows:—Beak strong, short, rounded, and broad, the cutting edge being nearly straight; nostrils of an oblong-oval form, and placed obliquely; wings long, the second and third quill-feathers the longest; legs strong and muscular; tarsi short, covered with reticulated scales; toes five, nearly equal in length, with the outer toe reversible; and all covered with strong, curved, sharp claws; the under surface of the toes being covered with small pointed scales. The osprey generally dwells near the sea-shore, on account of its living nearly exclusively on fish; and it is found in considerable abundance in North America, particularly on Long Island, New York. It catches its prey by sailing at a considerable altitude above the surface of the water, and when it perceives it, suddenly darting down and bearing it off in its claws with triumph. It measures about twenty-two inches in length. The beak is black, the eye blue, and the irides yellow; the top of the head and neck is white, shaded with brown; the whole upper surface of the body brown, with the ends of the primary feathers of the wings black; the under surface of the body white and the tail brown. It builds its nest on high trees or rocks, or about old ruins near the sea, or by the margins of lakes and rivers; and it lays three eggs, which are about two inches long, and are blotched and spotted over with reddish spots. The American naturalists, who have every facility for describing the natural habits of the bird, state that during the period of incubation the male watches near, and supplies the wants of the female, catching fish for her, so that she should not be obliged to leave the nest. The parent birds feed the young until they are perfectly able to fish and provide for themselves. It is stated in Mr Yarrell's "History of British Birds," that several specimens of the osprey have been obtained in Surrey, Sussex, and Durham; and Sir William Jardine observes in his notes to "Wilson's Birds of America," that a pair or two of ospreys may be seen about most of the Highland lochs, where they fish and breed every year.

OSSIFICATION, *os-se-fik-ai'-shun*, (from Lat. *os*, bone; *facio*, I make,) the formation of bone.—In the growth of the skeleten of man and the higher animals, this process goes on naturally, and it occurs in the reproduction of new bones after the destruction or loss of old ones. Ossification also occurs as an unnatural or morbid process, and is observed in several tissues of the body. It occurs most frequently in the cartilages of the ribs, where the process is almost constantly going on in advancing years. Bone begins to form in the cartilages of the ribs after the fiftieth year; but in some cases it commences between the ages of thirty and forty. The cartilages of the windpipe are next to those of the ribs in their liability to become osseous. Ossification of the movable joints never occurs. The disease called ossification of the heart is not an affection of the proper substance of that organ, but of its valves, in which earthy matter is sometimes deposited; thus rendering them stiff and unyielding. This substance is composed of carbonite and phosphate of lime, as bone is; but its particles have no definite arrangement.

OSTEOLOGY, *os-te-ol'-o-je*, (Gr. *osteon*, a bone, and *logos*, a discourse,) is that part of the science of anatomy which treats of the bones. (*See* ANATOMY, BONE.)

OSTREÆ. (*See* OYSTER.)

OSTRICH, *os'-tritsh*, (Fr. *autruche.*)—This, the largest of known birds, distinguished not only for its great size, but for the beauty and value of its plumage, presents the following characteristics:—The true, or African ostrich, is from seven to nine feet high from the top of its head to the ground; the head, which is small, and the neck, which is long, are destitute of feathers, being clothed only with a few scattered hairs; the bill is straight and depressed. The feathers on the body are blackish; those on the wings and tail white, sometimes marked with black. The thighs are as bare as the head and neck, and the legs hard and scaly. The most distinguishing features of the ostrich are the shortness of its wings, which are furnished with spurs, and the peculiar arrangement of their feathers, which utterly unfit the bird for flight. The bird appears to have been known from the earliest times; it was forbidden in the Old Testament as an article of food, and was much prized by the gourmands of the Roman empire. The African ostrich frequents the burning sands of that continent in large flocks. The female lays from ten to twelve eggs, several times a year, in a hole in the sand, and broods over them only in the night, leaving them to be acted on by the sun during the hottest part of the day. As fashion has, for some time since, set a high value on certain feathers in the back or tail of the ostrich, it is frequently hunted, but is caught with difficulty; as by the aid of his wings he is able to run far more swiftly than the fleetest horse. The Arabians and Moors have two methods by which they are enabled to come up with them. In the one case, one of the hunting party pursues the bird, which always runs in a circuitous direction, as long as possible, and then the chase is taken up by another on a fresh horse, and so on, until the bird is worn down. The other method is, for a hunter to cover himself with an ostrich-skin, and thus be enabled to approach the flock sufficiently near to surprise it. The ostrich, in a tame state, and probably also when wild, is apt to swallow with the greatest voracity such indigestible substances as iron, nails, stones, and bits of rag or leather; and is even, in one instance, said to have swallowed leaden bullets hot from the mould without any apparent inconvenience. There is a species of ostrich found in South America, principally on the great plains in Buenos Ayres and the neighbouring states, which is inferior to the African ostrich in size, whilst its plumage, which is of a uniform gray colour, is almost valueless. Its scientific name is PHEÆ, (*q. v.*) The trade in ostrich feathers is divided principally between London and Leghorn. White feathers are worth from £6 to £12 the Tuscan pound, (nearly twelve ounces,) and black ones from £1, 4s. to £3, 9s.

OTIS. (*See* BUSTARD.)

OTOCYON, *o-to's-si-on*, a pretty little species of fox, living in Southern Africa, and remarkable for its enormous ears. It is gray in colour, but has a full, black tail.

OTTER, *ot'-ter*, (Sax. *uter*,) a genus of carnivorous mammalia belonging to Cuvier's second tribe, or those which walk on their toes. In many particulars they resemble weasels, martins, and polecats; but in other respects they differ from them. They have long flexible bodies, low on the legs; their heads are compressed, and their tongues a little rough; but they differ chiefly from the animals just alluded to, from having their feet webbed and adapted for swimming, and their tails slightly flattened horizontally. They are excellent swimmers, and feed almost entirely upon fish, which they frequently destroy wantonly, when they do not need it for food. The otter is found in many countries widely distant from each other, and they differ in some particulars, according to the climate which they inhabit; the otters of India, for instance, having the hair very rough, whilst, in Kamtschatka, the covering of the otter is very soft and fine. But the coverings of otters of all countries have more resemblance to each other than those of land animals, being all grayish-brown, more or less dark on the upper part of the body, and generally white or whitish under the throat. The fur of all of them has the property of the feathers of diving birds, in not becoming wetted; and otters of all species reside in burrows, forming the entrance of their holes under water, and working upwards, making a small orifice for the admission of air in the midst of some neighbouring bush. The period of gestation is about nine weeks, and the litter consists of four or five. They make their appearance about April, and the mother drives them from the nest to shift for themselves about May.—The European, or common otter, is about two feet in length to the insertion of the tail, which is sixteen inches long; it is brown above, and whitish around the lips, on the cheeks, and beneath. The American otter, which is found in the rivers of North America as well as those of the South, is rather larger than the European otter, and is distinguished by having merely a margin of naked skin round the nostrils instead of the distinct naked muzzle of the latter. It is also described as being more social than most of the otters, small troops of this species inhabiting the same places of the rivers, and several females taking up their abode and producing their young in the same nest. Several distinct species of otters have been described as existing in one place or other of Central America; but most of them differ little from the more generally distributed species, except in size and colour. This may be said also of the *Nir-Nayee* and *Barang otters*, found in India. But the *Cape otter*, found in Southern Africa, has some distinguishing characters between it and other otters, the most striking of which are found in the feet. The toes of this species are very short and thick, and joined by very soft membranes; they are very unequal in length, the first phalanx on them is soldered to the next in the second and third: there are no claws on any of the toes, except on two large ones on the hind feet, and the general structure of the fore-feet would seem to infer that the animal is unable to dig a burrow for itself. Another distinct species of otter is the marine otter, which is found on the north-western coasts of North America and the shores of Kamtschatka, and is much larger than the other species, being about three feet and a half long in the body; the tail, however, being shorter in proportion, and not exceeding fifteen inches. The general colour is a beautiful maroon brown, but the head, neck, and under parts of the fore-legs are brownish silver-gray. Its skin is accounted the finest of all furs both in texture and durability, and a single one often brings, in the markets of China and Japan, as much as £20. As an inhabitant of the sea, it approximates to the seal in its habits, and in some degree in its structure; the hind-legs are shorter than in the common otter, and brought nearer to each other; the toes are shorter, and the claws shorter by the webs extending nearly to their points; and at the same time the fore-feet are but ill adapted for walking. It frequents sea-washed shores during the winter, living on fish, crustacea, and sea-weed, and in summer ascends the rivers and enters the fresh-water lakes; salt or fresh water being indifferent to the otter as an element in which to perform his operations. In former times otter-hunting was a sport greatly in fashion in England, and is still occasionally practised. The otter, if procured young, may be tamed and taught to catch fish for its master; but the natural fierceness of the animal makes this a difficult task.

Ouistiti. (*See* Marmoset.)

Ounce, *ouns*, a beautiful species of Leopards living in certain parts of Asia, and remarkable for its long, full hair. The colour of the fur is gray white, and diversified with many rather indistinct black spots.

Ourang-Outang, *oo'-răng-oo'-tăng*, (Malay, wild man of the woods.)—The name *Ourang* has been given to a species of ape found in Africa, and commonly called the black orang; but the ourang-outang is a large ape, about five feet high, of a reddish-brown colour, a native of Sumatra and Borneo. Its native name in Borneo is "Mias," and it abounds in the low swampy grounds, covered with forests, of the south-western districts. This animal never jumps or springs, and yet progresses at a great pace as it swings from tree to tree. They sleep in a species of temporary nest made from day to day, of leafy branches laid across one another. They are not gregarious, but live in pairs with their young ones. Their food consists of fruits and berries, some of which are intensely bitter. The natives of the districts they frequent assert that the ourang-outang never attacks or is attacked by any animal except the crocodile, which attempts to seize him when he goes to the water's edge.

Ourebi, *oo'-rĕ-bee*, a pretty antelope of Southern Africa, (*Scopophorus ourebi*,) which is generally found in the open plains. It is pale dun in colour, and the male is armed with strong, sharp, and deeply-ringed horns. The height of the antelope is about two feet.

Ousel, Water. (*See* Dipper.)

Ouzel, Ring, *oo'-zel*, a species of Thrush, (*Tardus torquatus*,) remarkable for a broad white ring round its black neck. It is not very common in England.

Ovary, *o'-va-re*, (from Lat. *ovum*, an egg,) in Bot., that part of the *pistil*, or central organ of the flower, which contains the rudimentary seeds or ovules. These rudimentary seeds are attached to a projection on the walls of the ovary called the *placenta*. The ovary is said to be *compound* when it is composed of two or more ovaries combined together; it is said to be *simple* when it constitutes the lower part of a simple pistil, or of one of the carpels of an apocarpous pistil. (*See* Carpel and Pistil.) The ovary, whether simple or compound, may be either adherent to the calyx or free from it. In the former case, as in the myrtle, it is *inferior* or *adherent*, and the calyx is *superior*; in the latter, as in the lychnis, it is *superior* or *free*, and the calyx is *inferior*. (The different kinds of placentation will be noticed under (PLACENTA.)

OVEN BIRD.—A remarkable bird belonging to the family of the Creepers, &c. It derives its name from its curious nest, which is built of mud, and is oven-shaped, with a little entrance at the side. The nest is generally placed on a beam, or the large branch of a tree.

OVIPAROUS ANIMALS, *o-vip'-ă-rus*, (Lat. *ovum*, an egg; *pario*, I am delivered of,) those which produce their young from eggs. According to Cuvier, in his "Règne Animal," the hemispheres of the brain of oviparous vertebrata are very slender, and are not united by a corpus callosum, (*see* BRAIN;) the crura of the cerebellum do not form the protuberance termed the *pons Varolii;* the nostrils are less complex; the ear has fewer small bones; and the cochlea, when it exists, (which it only does in birds,) is much more simple. The oviparous animals are divided into three classes:—1. The birds; 2. The reptiles; and 3. The fishes. Oviparous generation consists essentially in the circumstance that the animal is not attached through the medium of a placenta to the parietes of the uterus, or of the oviduct, but remains separated from it by its most external envelope. Its aliment is prepared beforehand, and inclosed in a sac attached to its intestinal canal: this is what is termed the vitellus, or yolk of egg, of which the young animal is a sort of appendage, at first imperceptible, but which is nourished and augmented by feeding on the fluid of that yolk. Those ovipara which breathe with lungs have, in addition to this, in the egg, a vascular membrane which appears to be subservient to respiration: it is connected with the bladder, and is analogous to the allantoid of the mammalia. It is neither found in fishes nor in frogs, which latter, when young, respire like fishes, by means of branchiæ or gills. The eggs of fishes have a general resemblance to those of birds, and consist of a vitellus and albumen with thin membranes; but in place of being furnished with a shell, they have a tough, or sometimes a horny covering; and some, as the torpedo and shark, are quadrangular in shape. The egg of the serpent is nearly the same with that of the fish, and is inclosed in a flexible membrane. The fœtus is coiled up spirally in it, and the chorion is vascular, as in the egg of the fowl. Those animals which are called oviparous hatch their eggs out of the body, either by sitting on them, as we see in fowls, or by exposing them to the heat of the sun, as the turtle, crocodile, and many species of serpents. Oviparous fishes, which comprehend all those called osseous, expel their ova into the water, where they are fecundated by the male without intercourse. The ova of frogs are likewise fecundated and hatched out of the body. They are enveloped in a glairy matter, which perhaps contributes to their increase; for during incubation, the egg both enlarges and changes its shape. Many of the cold-blooded ovipara do not bring forth their young until they are developed and extricated from the shell or other membranes which separated them from the mother. These are called *false ovipara*, or *ovo-vivipara*.

OWL, *owl*, (Sax. *ula*,) a bird belonging to the order Raptores and the genus Strigidæ. According to Sir William Jardine, owls may be regarded as nocturnal hawks, although of the whole, as a family, but little is known. In Great Britain, the members of it are limited in numbers, amounting only to six or seven species, and some of these even are of extreme rarity, and are only partial or periodical visitors. They fill during the night the same offices which are performed by the bolder hunting falcons in the open day, and they serve to keep in check the increase of mice and other small mammalia which come out at night. For this purpose, the various organs of the owls are beautifully adapted. The vision is acute, although not suited to the light of noon; their ears are contrived to catch sound in the broadest way, and also possess a delicate perception; while their plumage is of the softest texture, falling lightly on the air, so as not to cause any obstruction, and the wings are constructed for light, buoyant, and noiseless flight. In addition to these advantages in the pursuit of their prey, another is found nearly as essential, and without which the others would be useless. The colour of the plumage exhibits a union of tints best suited for concealment, for a chaste and harmonious arrangement of colours renders the owls invisible in the gloomy twilight or gray darkness of night. The tarsi and beak, although not showing any great strength, are finely formed for grasping; for, as in the *Scansores*, the external toe is versatile. The foot can thus be used either in scrambling in the interior of some rent or chimney, or in the hollow of a tree, while it also becomes more complete as an organ of prehension. In their habits, owls may generally be termed arboreal, the dark recesses of the forest, or wooded rocks, affording cover from the too strong light of the day. From these retreats they sally out at nightfall on predatory excursions, seldom returning without something for their nest. Their eggs are of a rounded form, and are always nearly pure white in colour. The geographical distribution of these birds is very extensive. The common white barn, or screech, owl, which may be taken as a type of the family, reaches the North American continent. The long-eared owl is identical both in North America and Africa. The short-eared owl is not uncommon in the former continent, and it is also common to Asia, several specimens having been obtained from China. The tawny owl, although somewhat resembling the barred owl of North America, yet is peculiar to Europe. The tawny owl inhabits Northern Europe and America, reaching nearly to the polar latitudes. In Great Britain this bird is, however, very rare. The family Strigidæ may be divided into three classes,—1, the Typical owls; 2, the Horned owls; and lastly, 3, the Hawk owls. In the first section, the adaptation to nocturnal habits is complete; the members of it also possess a large external ear, and complete discs round the eyes. In the second, the horned owls have two feathery tufts on the head, resembling horns, and the external ear is smaller. In the third, the hawk owls have the external ear very small, and the feathery tufts and the discs round the eyes altogether wanting. The generic characters of the white or barn owl, (*Strix flammea*,) which we have selected as altogether typical of the family, may be thus briefly described: Head smooth, not furnished with tufts; beak straight at the base, considerably curved at the point; cutting margin of the upper mandible nearly straight; under mandible notched; nostrils oval and oblique;

facial disc large and complete; auditory opening large, and furnished with an operculum; wings long and ample; second quill-feather generally the longest, the first and third equal in length; legs long and slender, clothed with downy feathers to the juncture with the toes, which latter are only furnished on the upper surface with a few hair-like feathers; claws long, curved, sharp, and grooved underneath. The white owl forms its habitation in churches, barns, old ruins, or holes in old trees. It is of the greatest use, as it devours large quantities of rats and mice; whence its services to agriculturists are very considerable indeed. Both owls, male and female, if they have young, sally out in search of these dainties, which they bring in large numbers to their nest. This owl lays from three to five eggs, and it is a common thing for them to be laid at different intervals; so that both eggs and young birds have been discovered in the nest at the same time. The head and upper parts of the body are a clear orange-colour, slightly marked with chestnut spots; the face is white; the wing-covers gray towards their tips; and the under surface of the body also white. It is about fourteen inches in length. Besides the barn or white owl, there are the tawny owl, (*Syrnium stridula*,) the eagle owl, (*Bubo maximus*,) the little-horned owl, (*Scops Aldrovandi*,) the long-eared owl, (*Otus vulgaris*,) the snowy owl, (*Surnia nyctea*,) the hawk owl, (*Surnia funerea*,) and the little owl, (*Noctua passerina*;) descriptions of which will be found clearly given in Yarrell's *History of British Birds*. The owls of different parts of the earth are so numerous that they cannot even be mentioned.

Owl, Sea. (*See* Lump-fish.)

Ox, *oks*, (Sax. *oxa*.) It has been suggested that the derivation of the word is probably from the Greek verb *auxo*, I increase, the prosperity of individuals in early times being estimated by the amount of cattle they possessed,) the male of the bovine genus of quadrupeds, castrated and grown to its full size. The fact that the ox, when living, may be a most valuable servant to man as a beast of burden or draught, and that, when dead, every portion of his carcass is capable of administering to the wants or comforts of his owner, appears to have been discovered in the earliest times; and accordingly, in the earliest records which we possess, the ox is mentioned with respect. In Egypt it was long an object of worship; and when the Israelites were disposed to relapse into idolatry after their flight from Egypt, it was in the form of a golden calf (the name of a young ox) that they modelled the object of their impious rites. The ancient accounts of the wild ox describe it to have been an animal of enormous size and great fierceness, and the fossil remains of oxen which are found in this and other countries certainly seem to prove that the oxen of ancient times possessed these characteristics. The history of the ox in this country commences with the account given by the Roman invader Cæsar of the state of the inhabitants when he invaded our island, from which we gather that they relied chiefly on the ox and the sheep for the supply of their wants. From that time to the commencement of the present century, however, it does not appear that any decided steps were taken towards the improvement of this breed of cattle, and its history is, consequently, a blank. The common ox of the present time may be described as an animal which has smooth hollow horns, a thick and heavy body, with a long tail terminated by a tuft of hair. There has been much dispute as to the origin of the British ox, some supposing that it has sprung from the Indian and European buffalo, and some treating them as arising from the *aurochs*, or wild cattle of Germany and Poland. There are several varieties of the ox in its wild state, which may be briefly described as,—the *Bos Americanus*, or American bison, the characteristics of which are short black rounded horns, with a great interval between their bases; a vast haunch, consisting of a fleshy substance much elevated; thick and strong foreparts of the body; hinder parts slender and weak. The *Bos bubalus*, or buffalo properly so called, originally a native of India, from whence it was introduced into Egypt, Greece, and Italy. The *Bos gaurus*, or Hindoo bull, with a dull and heavy aspect, but in reality almost equalling the buffalo in activity and strength. The *Bos Caffer*, or Cape buffalo, distinguished for the size and extent of its horns, its great strength and ferocity. The *American Bison*, and the *Musk Ox*, the latter of which is a most singular animal, clothed with full, long, matted wool, or dense fur, and found in the high latitudes of North America and the lands of the Esquimaux, from the 61st to the 75th degree of latitude. The flesh is strongly imbued with musk, especially at certain seasons; but at other times is tolerable food, and is eaten both by the Esquimaux and the fur-hunters. Of the ancient race of British cattle some remains are yet to be found in several parts of England, and are characterised by creamy-white skins, black muzzles, and white horns with black tips bending upwards. The modern breeds of oxen in Great Britain are remarkable for their numerous varieties, caused by the almost endless crossings of one breed with another; the principal varieties, however, are the North Devon, distinguished for the activity of its movements, its docility, and powers of labour. The Hereford, which are larger than the Devon and fatten to a much greater weight. The Sussex, which has all the activity of the Devon and the strength of the Hereford, the propensity to fatten, and the fine-grained flesh of both. The Welsh, which are stunted in their growth, from the poverty of their pastures; but which thrive where others starve, and which rapidly outstrip most others when they have plenty of good pasture. The Scotch, of which there are many varieties; the principal being the West Highlanders, or Kyloes as they are called; the Argyleshire breed; the cattle of the Shetland Islands, which are dwarfish, ill-shaped, and covered with hair. Fifeshire possesses a breed peculiar to itself of a very superior description; and the Galloway polled cattle are a fine and valuable breed, from which is descended the celebrated dun cow of Suffolk. Of Irish cattle there are two breeds,—the middle-horns and the long-horns; the former being the original breed, tenanting the forests and most mountainous districts; whilst the latter are descended from an old Lancashire or Yorkshire breed. Almost every part of the ox is of use to mankind. Boxes, combs, knife-handles, and drinking-vessels are made of the horns; glue is made of the cartilages, gristles, and the finer pieces of cuttings and parings of the hides. The skin of the young ox is made into vellum; the hair is valuable in various manufactures, and the suet, fat, and tallow for candles. The value of its flesh as food need scarcely be mentioned.

Ox-bird. (*See* Dunlin.)

Oyster, *ois'-ter,* (Gr. *ostreon,* from *osteon,* a bone.)—The large and important family of *Ostreadæ* includes shells of very various outline and sculpture, constructed by animals varying in several particulars, but having so many important characters in common, that in natural history they are considered to belong to the same group. The genus consists of more than a hundred and thirty species, of which we here propose to confine our attention to one,—the edible oyster, (*Ostrea edulis,*) which, in the language of science, may be described as a bivalvular testaceous animal; shell variously shaped, inequivalve, more or less inequilateral, often thick and irregular; upper valve most frequently flat or concave, under one, convex; surface foliated, or with radiating furrows; hinge without teeth; ligament lodged in a pit in each valve; the beak behind that of the under valve often produced, and exhibiting a furrowed ligamental area. The oysters were known to, and valued by, the ancients; the Athenians are said to have prized them, and the manner in which such Latin writers as Horace, Juvenal, and Cicero have spoken of them, shows that they were in high esteem among the Romans, who, in the time of Nero, consumed as many annually as are now eaten in London. These, however, were but the small Mediterranean oyster; and it was not until the period when Agricola ruled in Britain that the people of Italy obtained oysters, which they valued beyond all others, from the shores of Kent. The *Ostrea edulis* may, indeed, be said to have its capital in Britain, since, although found elsewhere on the coasts of Europe, both northwards and southwards, in no part of them does it attain such perfection as in our seas. Oysters are found in various places on the coast of France; as at the mouth of the Seine; on the coast of Caen, in Normandy, where there is a bank six miles long by one in breadth; and at Cancale, on the coast of Brittany. Spain has oysters, which are of a red or russet colour. The Dutch have oyster-beds on the coast of Zealand; but their most famous oysters are those which they transport every year from the English coast, and preserve in pits at Petten, in North Holland. The northern part of Germany is supplied with oysters from exceedingly rich banks on the coasts of Holstein and in the neighbourhood of Jutland. Norway and Sweden have oyster-beds on various parts of their coasts. Italy has oysters of various qualities; those found at Ancona being of large size, but not well tasted; whilst those found in prodigious quantities near Tarentum, in the sea called Mare Piccolo, are excellent. In the West Indies, oysters are tolerably abundant, and are frequently found growing on the boughs of mangrove-trees, which, in such places as the heads of bays or harbours, are frequently under water. The largest supply of oysters, in Britain at least, is derived not from natural but from artificial beds. An oyster-bed is a cavity or reservoir, which communicates with the sea by means of a canal, and in such a manner that the water may be kept in or let out at low tide by means of locks or traps. These beds are supplied by men called dredgers, who, in the month of May, when the oysters cast their spawn or spat, proceed to the natural beds, and letting down rakes or scrapers, on which are fastened bags of sail-cloth, leather, or network, drag them along its bottom by boats in full sail, or rowing-boats. When the nets are drawn to the surface, there are found, together with oysters, pieces of wood, stones, old oyster-shells, &c., technically known as *cultch,* to which the *spat* has adhered, and which, within twenty-four hours of its deposit, has begun to have a shell. The dredgers then gently remove with a knife the small brood from the cultch, and (under a penalty) throw the latter in again, as it is found by experience, that if the *cultch* be removed, the ooze increases, and that the oysters are destroyed, having no convenience for depositing their spat. The oyster-beds from which the principal supply for the London market is procured, are those of Whitstable, Rochester, Milton, Colchester, Burnham, Faversham, and Queenborough, all artificial beds, furnishing a small, ovate, deep-shelled variety, called *natives.* Oysters grown on artificial beds are considered full grown when from five to seven years old; sea oysters at four years, the age being shown by the annual layers or "shoots" on the convex valve. Much labour is required to keep the beds in good order, cleansed from shells and rubbish, and the oyster's enemies, such as star-fishes and barnacles. If carefully attended to, a bed may last any length of time; but if neglected, it will become overgrown with weed and buried in mud, and can only be reclaimed by re-stocking. The trade in oysters now ranks in importance in England with the herring, pilchard, and other fisheries. As a specimen of the extent to which they are eaten, it may be mentioned that in London, where the chief consumption of the common oyster is from the 4th August to January, and of natives from October to March, about three hundred thousand imperial bushels are consumed. The oyster-fishery of most consequence in Scotland is that of the Frith of Forth, where the oyster-beds are some twenty miles in extent. On both sides of Ireland oysters abound, and in several places are of excellent quality; the Burran oysters, (known as Burton Bindon's oysters,) brought from the Burran Bank, in Galway Bay, an artificial bed, supplied chiefly from a natural bank near Ochil Head, being especially esteemed. The oyster-beds in Belfast Bay may be also mentioned as supplying oysters of very large size, the shells being in length from five inches and a half to six inches and a half; in breadth from five inches to five inches and a half; and in depth, with the valves closed two inches and a half. Oysters are of different colours in different places; those of Spain being, as already mentioned, of a red colour; those of Illyra brown; and those of the Red Sea of the colour of the rainbow. The only coloured oysters, however, which are in repute, are green oysters; such as those of the Bay of Biscay, Dieppe, Cancale, and the Marennes, which are in such esteem that other oysters are frequently made to assume their hue by artificial means; namely, by placing them in pits in the salt-marshes, and covering them with salt-water to the depth of about a foot and a half. These pits, from some quality in the soil co-operating with the heat of the sun, will become green and communicate their colour to the oysters that are put into them in four or five days, though they are commonly allowed to remain there six weeks or two months, by which time they will be of a dark green. Oysters are often covered with productions of the coral kind and with barnacles, and are subject to several kinds of parasites, the most remarkable of which is the oyster-worm, which presents the appearance, on the opening of the oyster subject to it, as a sort of shining clammy moisture, like a star of a bluish colour, but which, when drawn out, proves to be a worm nearly half an inch long.

Oyster-catcher.—A very handsome bird of our own coasts, allied to the plovers. (*Hæmatopus ostralegus.*) It lives mostly on marine molluscs, hence its name. The plumage is black and white, and has earned for the bird the popular name of sea-pie.

P.

Paca, *pa'h-ka*, a group of South American rodents, belonging to the genus Cœlogenys, or pouch-cheeked animals. They are known by the large pouches which are formed by the skin of the cheeks. They are destructive creatures, devouring the crops, and are therefore killed in great numbers. As is the case with the generality of rodents, their flesh is eatable.

Pachydermata, *păk-e-der'-mă-tă*, (Gr. *pachus*, thick, and *derma*, skin,) an order of quadrupeds, mammalians, such as the elaphant, hippopotamus, &c., distinguished from others by the thickness of their skins. The *pachydermata* are subdivided into three genera —viz., 1. The *Probosceidea*, which enumerates such as have a long proboscis, and five toes on each foot, enveloped in a thick horny skin; the elephant may be mentioned as a type of this subdivision. 2. The *Pachydermata ordinaria*, in which the feet may have four, three, or two separate toes; as, for instance, the hippopotamus, rhinoceros, tapir, &c.; and 3, and lastly, The *Solidungula*, which possess only one toe and a single hoof to each foot, as in the horse and other *Equidæ*. (*See* Horse, where the peculiar conformation of the metacarpus and metatarsal bones is fully described.)

Paco. (*See* Alpaca.)

Pagurus. (*See* Hermit Crab.)

Palæontology, *pai'-le-on-tol'-o-je*, (Gr. *palaios*, ancient; *onta*, beings; *logos*, a discourse,) that branch of natural science which treats of fossil organic remains. Much of the light that has been thrown, of late years, on the formation and constitution of the globe is due to the discoveries and investigations of palæontology. The geologist, by its means, is able to trace the successive orders of animals and plants which have inhabited the earth at different periods of its existence. All fossiliferous systems may be viewed in two great aspects—either as regards their mere mineral and physical relations, or as regards the plants and animals found as fossils in their strata. The former constitutes the lithology, and the latter the palæontology, of a formation. In order, however, to arrive at a knowledge of the cosmical conditions which regulated the deposition of the strata of a system, an acquaintance with botany and geology is indispensable to the geologist, in order that he may be able to apply their general principles to the solutions of those problems that arise out of the science he is investigating.—Ref. *Advanced Text-book of Geology*, by Page.

Palæmon. (*See* Prawn.)

Palæornis. (*See* Parraqueet.)

Palate, *păl'-ait*, (Lat. *palatum*,) the roof or upper part of the mouth. In man it is composed of two parts—the hard palate, which forms an arch in the anterior part of the mouth, and the soft palate, which lies in the posterior part of the mouth, and consists of a membranous curtain of muscular and cellular tissue, from the middle of which hangs the uvula.

Pallah, *pal'-la*, a handsome antelope of Southern Africa, (*Æpyceros melampus.*) It is sometimes called the Rooye-bok. It is bay in colour, with a semilunar black mark on the croup, and black backs to its feet. The horns are long, ringed, and rather large shaped, but variable in their form. It is generally found near brushwood; and if a herd of these antelopes be disturbed, they walk off in single file, each lifting its feet very high, so as not to break any sticks.

Pancreas, *păn' kre-ăs*, (Gr. *pan*, all, and *kreas*, flesh,) in Anat., is a single glandular organ, situated transversely across the upper part of the abdomen, at the posterior part of the epigastric region, about on a level with the last dorsal vertebra. It is of an irregular, elongated form, from six to eight inches in length, an inch and a half in breadth, and from half an inch to an inch thick. The right extremity or head is curved upon itself from above downwards, and is embraced by the concavity of the duodenum. Its body tapers towards its left extremity, where it forms a tail terminating at the spleen. The pancreatic duct extends from left to right through the substance of the pancreas, giving off numerous branches, and terminating in the common choledic duct, which conducts its secretions to the duodenum. In structure the pancreas closely resembles the salivary glands, but it is looser and softer in texture; and the fluid secreted is almost identical with saliva. Its object is believed to be to reduce fatty matters to the state of an emulsion, and thereby promote their absorption by the lacteals. The amount daily secreted by man is from five to seven ounces, and it is most abundant at the commencement of digestion. Its importance is evident from the fact that it is found in all vertebrates, whether carnivorous or herbivorous.

Panda, *pan'-dah*, an animal belonging to the family Ursidæ, or Bears, remarkable for the extreme beauty of its coat, which is full, thick, soft, and sheeny as velvet, the colour being rich chestnut brown, darkening with black. The head is pale fawn, with a chestnut mark under the eyes. It is a native of Nepaul, and is called by several names—such as Wah and Chittra. Its scientific name is *Ailurus fulgens.*

Pandion. (*See* Osprey.)

Pandora. (*See* Braize.)

Panther, *păn'-ther*, (Gr. *panther*,) *Felis Pardus*, a large quadruped, measuring about six feet and a half from nose to tail, and belonging to the order Felidæ, (*which see.*) It is principally found in Africa, although it is also scattered through the southern parts of Asia and the Indian Archipelago. It is fawn-coloured above and white beneath, with six or seven rows of black spots on its flanks. In some, the ground of the fur is black, with spots of a deeper colour; but they are not a distinct species. The tail is about the length of the body deprived of the head. The panther much resembles the leopard; and, indeed, the two species have been often confounded together, as no naturalist in early times ever seems to have taken the trouble to point out the difference between the two animals. According to Mr Swainson, in his work entitled "Animals in Menageries," "the leopard, as defined by Major Smith, when compared with the jaguar and panther of naturalists, is uniformly of a paler yellowish colour, rather smaller, and the dots rose-formed, or consisting of several dots, partially united into a circular figure in some instances, and into quadrangular, triangular, or other less determinate forms in others; there are also several single isolated black spots, which more especially occur on the outside of the limbs." The panther, according to Professor Lichtenstein, of Berlin, "resembles the jaguar in having the same number of rows of spots, but is distinguished by having no small dots on the dorsal one." But, as Major Smith observes, "it does not appear that full spots on the dorsal line always make a specific character of the jaguar; and the Asiatic leopard is sometimes distinguished by this peculiarity, though it does not in other respects resemble the American animal. When, therefore, it is said that the panther much resembles the jaguar, it is always to be strongly suspected that the type whence the observations have been taken is in reality an American animal." The panthers used to be exhibited in Rome in large numbers on the occasion of the celebration of any triumphal procession; and hence it appears that they were far more numerous in the days of antiquity than in the present time. Pompey is said to have exhibited five hundred and ten, while Augustus Cæsar even eclipsed the latter by exhibiting no less a number than five hundred and twenty. There is a species termed *panther* in America, which, however, does not belong to the family, and which will be found described under the article PUMA.

PAPER NAUTILUS.—A mollusc belonging to the cephalopods, and remarkable for the beautiful form and fragile texture of its shell.

PAPILIONACEÆ, *pă-pil-yo-nai'-se-e*, (Lat. *papilio*, a butterfly, from the resemblance which the flowers bear to this insect,) in Bot., a subord. of the large and important nat. ord. LEGUMINOSÆ, (*which see*.)

PAPILIONIDÆ, *pă-pil-yo-ni'-de*, (Lat. *papilio*, a butterfly,) a gen. and fam. of lepidopterous insects, belonging to the section of the class termed *Diurna*. This family is the only one which, in the exterior margin of the inferior wings, does not present a rigid scaly appendage, or bridle, for retaining the two superior ones. These latter, and even the former, most frequently are raised perpendicularly when the insect is at rest. The antennæ are sometimes terminated by a globuliform inflation or little club, and are sometimes almost of equal thickness throughout, or even more slender, and form a hooked point at the extremity. According to Cuvier, the *papiliones* properly so called, or those belonging to the Linnæan division of the *Equites*, are connected by one extremity of the genus with the mottled Danaides, and by the other with the Parnassii. From the latter we pass to Thais, and thence to Pearis. The preceding Danaides connect themselves with the Heliconii. From this it follows that we should begin the series of the diurnal Lepidoptera with the Tetrapoda, such as Sytarus, Pavonia, Morpho, and Nymphalis, in order to reach the Heliconii through Argymnis and Cetheria. The Diurnæ would be divided thus into two great sections,—those whose chrysalids are suspended vertically, and simply attached by the extremity of the tail, and those where they are not only fixed by that extremity, but also by a silken band surrounding the body like a sling. The first are always tetrapodous; consequently, we should begin with those of which the caterpillars are naked or nearly so, and generally bifid at the posterior extremity; and then we should work up to those that are spinous. The greater variety of the *Papilionidæ* are tropical; and but one has been found in England,—the *Papilio Machaon*. (*See* BUTTERFLY.)

PAPIO. (*See* DRILL and MANDRILL.)

PARADISEA. (*See* BIRDS OF PARADISE.)

PARADOXURUS, *pa-ra-dox-eu'-rus*, an animal allied to the Ichneumons, which lives in India. Its native name is Luwack. It derives the name of Paradoxurus, or puzzle-tail, from the fact that it can coil its tail into a curl. The general hue is very dark yellow-brown, with six rows of spots along the back.

PARDALOTUS. (*See* DIAMOND BIRD.)

PARMOPHORUS. (*See* LIMPETS.)

PAROTID GLAND, *pă-rot'-id*, (Gr. *para*, and *ous*, *otos*, the ear,) in Anat., is the largest of the salivary glands, and is so named because it is situated near the ears. It is subject to tumours, which are often difficult to remove. (*See* MUMPS.)

PARRA. (*See* JACANA.)

PARRAQUEET, *păr-ro-keet'*, (Fr. *perroquet*,) a bird belonging to the gen. *Palæornis*, of the fam. *Psittacidæ*. It is distinguished by having the bill thickish, with the upper mandible dilated, the culmen rounded, the inferior mandible wide, short, and emarginate, and the tongue thick and smooth. The wings are of mean length, and the three first quill-feathers the longest, and nearly equal; exterior webs of the second, third, and fourth quills dilated near the middle, and tapering towards the apex. Tail graduated, with the two middle feathers slender, and greatly exceeding the rest in length, with their tips rounded. The feet have the tarsi rather short, and the claws strong and falcate. The different species of the genus *Palæornis* known to naturalists are natives of India, the Indian Archipelago, and Africa, with one exception,—the *Palæornis Barrabandi*, which is a native of Australia. This latter specimen is also called the Barraband ring-parraqueet, and it may be as well first described. In size it is about fifteen inches long, of which the tail alone measures over eight. The bill is red; the throat and fore-neck yellow; the space below the bill, eyes, and ear-coverts grass-green; a red collar round the neck; the upper and under surface of the body green, tinged with blue upon the back part of the head and outer margins of the quill-feathers; the upper surface of the tail green; the under surface of the wings and tail blackish brown; and, finally, the legs are black. The Alexandrine ring-parraqueet (*P. Alexandri*) is another handsome variety of this bird, and it was first brought by the Greeks from the island of Ceylon during the Macedonian expedition. It is very docile, and has a facility of pronunciation not inferior to any other of the parrot family. The Malacca ring-parraqueet (*Palæornis malaccensis*) is another variety, and, as its name implies, is a native of Malacca. The Carolina parraqueet (*Psittacus carolinensis*, Wilson and Audubon) is another member of this family, and is the only variety of the parrot family found in this part of America. This species is about fourteen inches long and twenty-two across the wings. The forehead and cheeks are orange-red, the rest of the head and neck a rich yellow; wings edged with orange-red. The body is of a bright yellowish glossy green colour above, with bluish reflections, which are shaded with yellow on the under part of the surface; the tail long and graduated, with the exterior feathers only half the length of the middle ones; the bill white, the claws black, the feet flesh-colour, and the iris hazel. Audubon describes these parraqueets as very destructive to husbandmen and gardeners, as they destroy vast quantities of grain and fruit every year. Many other birds belonging to the parrot family are popularly but erroneously called parroqueets, on account of their small size.

PARROT, *păr'-rot*, (*Psittacus*,) a bird belonging to the ord. *Insessores*, and its division *Scansores*, in accordance with its climbing powers. The family consists of about 170 different species, and is not less remarkable for the peculiarity of their form, and the gay and splendid plumage in which they are attired, than for the intelligence and docility so many of them evince in a state of captivity or domestication, and the peculiar facility possessed by some species of imitating the intonations of the human voice, and learning by rote words and sentences which they remember and repeat with clearness and precision. The general characters of the family may be stated as follows:—Bill convex, large, deflected, thick, and strong, the upper mandible overhanging the under, hooked at the tip, and furnished with a small cere at the base; the under mandible strong, thick, ascending, and forming, when closed, an angle with the upper one. Tongue thick, fleshy, and soft; nostrils round, and placed in the cere at the back of the bill; feet scansorial, and the external toes longer than the inner. With regard to the internal anatomy of the bird, it may be mentioned that the bill is furnished with strong additional muscles, and that the intestinal canal is of great length, and is destitute of cæca. Many of the species appear gregarious, and, except during the breeding season, are always seen in large numbers together: other species, as the cockatoos, are met with only in pairs. They select the hollows of decayed trees for the purpose of hatching their eggs and rearing their young; and they make no nest, but deposit their eggs upon the bare wood: the eggs vary in number from two to five or six. Their natural voice consists of hoarse or shrill piercing screams, with but little modulation. Their power of imitating the human voice is not possessed by all the species, but is confined to a few, particularly to the short even-tailed parrots, which have the tongue large, broad, and fleshy at the tip. They are found in America as far south as the Straits of Magellan, and likewise in Australia and Tasmania; so they are not confined, as Buffon imagined, to the torrid zone, although in that latitude their plumage is more gorgeous than farther south. The first sub-family is that of the Macaws, (*Macrocercinæ*,) which will be found described under art. MACAW. The next subdivision is termed the family *Paœlornina*, (*see* PARRAQUEET;) and next come the *Psittacina*, under which title is comprehended that class of birds which we more strictly denominate Parrots. Wagler, in his "Monographia Psittacorum," has divided these into four genera,—*Eclectus*, *Psittacodis*, *Psittacus*, and *Piornis*. The plumage of these is compact, and the feathers of the neck broad, truncate, and imbricated. With the exception of the gray parrot, (*Psittacus erythacus*, Linn.,) these are all inhabitants of the continent of America. The prevailing colour of their plumage is green, varied with red, blue, and yellow. First among these is placed, by Mr Selby, the festive parrot (*P. festivus*), which is a native of Guiana, Cayenne, and the Brazils, in South America. It measures between fifteen and sixteen inches in length, and its plumage is nearly a prevailing green colour. The gray parrot is a native of Western Africa, and is one of the best-known species of the tribe. Its imitative and talkative powers are unequalled by any of the others, and consequently it is much in request as an amusing companion. It is about twelve inches in length, and the whole of its plumage, with the exception of its tail, which is bright scarlet, is ashy gray, which is deepest in colour on the back. The grand eclectus, (*Eclectus grandis*, Wagler,) the southern Nestor, (*Nestor hypopolius*), and several others, might be mentioned as members of this family, if space allowed. This last-mentioned bird is now thought to be extinct. The *Loriana* form a separate branch, and are so named on account of their beautiful scarlet colour and their call-note, which resembles their name. The *Lorikeets* are a sub-division of these last-mentioned species, and they present the characteristics of the parraqueets mingled with those of the lory. (*See* COCKATOO, MACAW, &c.)

PARROT-FISHES, a singular group of fishes (*Scarus*) found in the hot seas. They are coloured in the most brilliant manner, often in variegated and regular patterns, and their mouths are hard, powerful, and curved like the beak of a parrot.

PARTRIDGE, *par'-tridje*, (*Perdix*,) a bird belonging to the gallinaceous fam. of birds termed *Tetraonidæ*. The characteristics of the common partridge (*Perdix cinerea*) are as follows:—Bill short, strong, naked at the base, upper mandible convex, deflected towards the tip; nostrils basal, lateral, and the orifice partly concealed by a naked arched scale; wings short, concave, and rounded in form, the first three feathers shorter than the fourth or fifth, which are the longest in the wing; tail short; feet with three toes in front and one behind, and those in front united by a membrane as far as the first articulation. The adult male of the partridge has the beak bluish white; the front of the neck and throat a bright yellowish chestnut; top of the head and back of the neck grayish-brown; the back and wing-coverts grounded with wood-brown, and shaded with chestnut-brown, the shaft of each feather being conspicuous in a streak of wood-brown; the tail-feathers of a uniform reddish chestnut; the neck and upper part of the breast, the sides, and flanks, light bluish gray, freckled in minute spots with a darker shade of the same colour, and barred with chestnut; the legs and toes bluish-white; and lastly, the claws brown. The entire length of this bird is about twelve inches and a half. The wing is rounded, and its length from the carpal joint to the end is six inches. The female is a little smaller than the male, and the gray feathers on the neck and under surface of the body are more tinged with brown. The birds pair in February, but very seldom commence to lay eggs before April or the beginning of May. Their nest is very simply constructed, as a slight depression of the ground, and a few leaves and pieces of grass scratched together, serve for the purpose. From twelve to twenty eggs are mostly produced, and they are of a uniform olive-brown colour, and about an inch and five lines in length and an inch broad. The period of incubation lasts twenty-one days, and both the male and female birds exhibit great solicitude for the covey as soon as they emerge from the shell. Partridges are carefully reared and preserved for the shooting season; and it is against the game laws to touch them until it commences, which it does on the first of September. Besides the common partridge, there are several other varieties; as the red-legged partridge, (*Perdix rufa*,) the Barbary partridge, (*Perdix petrosa*,) and the American partridge, called also the Virginian colin, (*Perdix virginiana* of Wilson and Audubon, and *Ortyx virginiana* of Macgill.) Sir William Jardine observes of partridges generally, in the "Naturalist's Library," that they form one point of connexion between the *Tetraonidæ* and the Pheasants, as there are many resemblances in their habits and dispositions, their harsh cry, and their spotted plumage. The guinea-fowl, he alleges, (*see* PINTADO,) is the link which goes between the two; and, like that bird, the partridge emits a sharp continuous cry at daybreak and at dusk, when the birds assemble to perch on the trees and woods which overhang the rivers. The genus *Perdix* was established by Brisson, taking the common European partridge as typical; but it was made to contain an assemblage of birds some of which which will not even rank amongst the family. The partridge is distributed extensively over Europe, and according to Temminck, extends to Barbary and Egypt, where it is migratory. It is also found in India and America; and several which have been sent to Australia by the Acclimatization Society (formed of a committee of scientific gentlemen for the purpose of benefiting the colonies) are doing remarkably well.—*Ref.* Yarrell's *British Birds;* Selby; and the works of other naturalists.

PARUS. (*See* TITMICE.)

PASSER. (*See* SPARROW.)

PASTOR, *pas'-tor*.—A beautiful bird allied to the Starlings, which is sometimes, but very rarely, found in England. The plumage of the bird is rose-pink, relieved by patches of black, and on the head there is a well-defined crest.

PATELLA. (*See* KNEE.)

PAVO. (*See* PEACOCK.)

PAVONARIA, *pa-vo-na'-ry-ah*.—A gen. of zoophytes, often called Sea-rushes, in which the stem is long, slender, and four-sided; and the polypes are arranged upon it in a spiral form.

PEACOCK, *pe'-kok* (Sax. *pawa*,) (*Pavo*,) a member of the *Pavonidæ*, a fam. of rasorial birds, whose characteristics are as follows:—Bill convex, rather stout, curved towards the end, and smooth at the base; cheeks partially naked; nostrils basal and open; head plumed, and surmounted with an aigrette-like crest; sixth quill-feather the longest; tail-feathers eighteen in number; tail-coverts very long, large, and extensible in the male.—(*Linnæus*.) There are two species of the peacock known, both inhabiting the continents and islands of India; and they present a plumage which is one of the most splendid in the whole feathered world. The beauty of the peacock attracted notice even at the earliest times; for it is mentioned as having been brought by Solomon's mariners to their royal master. Next we hear of it as having been discovered by the army of Alexander; and hence it found its way into Greece, Rome, and Europe generally. It had, amongst the Romans, to perform an honourable part in their luxurious entertainments; and it was thought worthy of being dedicated to Juno, and of being imprinted on the coinage of the era. At an early period of English history they were known; and there was scarcely any noble feast at which a roast peacock did not make an imposing appearance. They were stuffed with spices and sweet herbs, roasted and served up whole, and covered, after dressing, with the skin and feathers. In our own times, peacocks are reared in our gardens and lawns more for ornamental than for culinary purposes. In their native countries, magnificent dresses are made of peacocks' feathers and trains; and a sunshade of the gorgeous feathers of this bird is thought the great attribute of nobility in the island of Java. The Javanese peacock (*Pavo muticus*, Linn.) is the most splendid of the two species known, although but little is understood of its history. In the voluminous works of Ulysses Aldrovandus the bird is first mentioned; and he sufficiently indicates it by the form of its crest, which, instead of being composed of a naked shafted feather, with a round and eyed tip, as in the common bird, has these plumes of almost uniform breadth. According to Sir William Jardine, this bird is nearly similar in size to the common peacock, but the whole plumage is of a more subdued brilliancy. The bare space upon the cheeks and below the eyes is of a fine gamboge-yellow. The head, neck, and fore-part of the breast are of a peculiar greenish tint, being brilliant with golden reflections in some lights, in others appearing dull and subdued. The lower parts are of a dull deep greenish-brown, instead of the rich blue of the well-known bird. The train is not so ample in proportion, and the eyes, or moons, are less numerous: the centre of each is rich blue, encircled with green, brown, and finally with a bronzed ring. The edges of the wing and quills are pale yellowish-red. The bill is of a grayish-brown colour, the iris deep hazel; and the legs strong, naked, reticulated, and dusky black. The Javanese peacock is a native of Java, Sumatra, and Burmah, as well as other parts of India. The common peacock (*Pavo cristatus*) differs but little from the one last described, except in the increased splendour of its plumage and the altered form of its crest. It has been long naturalized in Europe, and in England it may be now looked upon as nearly a native bird.

PEACOCK-PHEASANT.—A splendid bird, which is brought from the Moluccas, (*Polyplection Napoleonis.*) It has a pointed violet crest on the head; and the whole of the head, breast, and neck are of the same hue. The short train is powdered with white spots, and each feather has a large green "eye" on its tip. The legs are remarkable for being armed with two spurs.

PEARLS, *purlz*, (Sax. *pearl*,) substances formed by certain bivalve molluscs allied to the oyster, and consisting of alternate concentric layers of membrane and carbonate of lime. The pearl oyster (*Mytilus margaritiferus*) belongs to the genus *Avicula* of Cuvier, has an equivalve shell, nearly semicircular in form, greenish in appearance without, and ornamented with the most beautiful nacre within. The shell is furnished with a rectilinear hinge, frequently extending into rings by its extremities, and furnished with narrow elongated ligaments, and occasionally with small notches near the mouth of the animal. In the interior side there is a notch for the byssus, a little beneath the angle of the mouth. The pearl oysters live in the warm seas of the East and West Indies, and they are found in large clusters, hanging on to rocks and other substances at the greatest depths. The places which they inhabit are termed "pearl-banks," and the most famous of these are off the west coast of Ceylon, at Tuticorem on the Coromandel coast, at the Bahrein Islands in the Gulf of Persia, at the Sooloo Islands, off the coast of Algiers, off St Margareta in the West Indies, and in the Bay of Panama. They have also been found off the Scotch coast, and indeed in various other places, but not in numbers sufficient to be noted, or to cause the fishery to be prosecuted. It used to be a popular superstition, before science was brought into play to destroy the illusion, that pearls are produced by the oyster swallowing the dew early in the morning, and that this dew was then converted by the marine animal into pearls! According to Dr Baird, it appears, however, that the ultimate cause of the oyster forming this beautiful substance is to get rid of a source of irritation. "Sometimes," he observes, "this happens from a grain of sand, or some such small foreign body, which has insinuated itself between the mantle of the oyster and the shell, and which, proving a great annoyance, the animal covers with a smooth coat of membrane, over which it spreads a layer of nacre. At other times, it is caused by some enemy of the inhabitant of the shell perforating it from the outside to get within reach of its prey. With a plug of this same matter, the oyster immediately fills up the opening made, and shutting out the intruder, balks it of its nefarious design. In both these cases we find the pearl usually adhering to the internal surface of the shell. The best, however, and the most valuable specimens are generally found in the body itself of the animal; and the source of irritation is here proved, according to the observations of Sir Everard Hume, who has paid great attention to this subject, to be the ovum or egg of the animal, which, instead of becoming ripe, proves abortive, and is not thrown out by the mother along with the others, but remains behind in the capsule in which the ova are generally contained. This capsule being still supplied with blood-vessels from the parent animal, goes on increasing in size for another year, and then receives a covering of nacre, the same as the animal spreads over the internal surface of the shell." The pearls found in the substance of the animal are generally round, but they are occasionally pear-shaped, in consequence of the pedicle by which the egg is attached being covered by the nacre as well as the egg itself. The pearl-fishery forms a source of considerable commercial speculation, and it may be as well here to describe the process by which the oysters are taken. As the Ceylon pearls are the most esteemed in England, a description of the fishery carried on in the bay of Condatchy will be given. The banks here extend several miles along the coast, from Manaar southwards, off Arippo, Condatchy, and Pomparipoo, the principal bank being opposite Condatchy, lying some twenty miles out to sea. After the banks have been surveyed, and a report made to government on the subject, they are sold for the season by auction to the highest bidder. The banks themselves are divided into five portions, which are fished annually in succession, in order that the oysters may have time to arrive at maturity, which they do in about six or seven years. The season for fishing commences in February, and ends about the beginning of April, the period allowed to the merchants to fish being six weeks, or two months at the utmost, during which time, however, from bad weather and other causes, the divers rarely have forty days' clear work. The men employed as divers are natives of the coast of Tuticorem, where they are known by the names of Marawas or Parawas. They are generally Roman Catholics, although belonging to the Malabar caste, and consequently have many holidays during the season, for saints' days, fasts, festivals, and other observances, which seriously interfere with the work. The boats are brought from the Coromandel and Malabar coasts, as they do not belong to Ceylon, and they also rendezvous at Condatchy Bay before sailing out. On the day before the season commences, a signal gun is fired from Arippo at ten o'clock at night, and the whole fleet sets sail with the land-breeze, generally arriving at the banks by daybreak, when they commence fishing, in which occupation they continue until noon, when they return to the bay with the sea-breeze, which rises about that time. On their arrival at the shore, the cargoes of the boats are immediately taken out; the boats have to be completely unloaded before night-time, and the oysters are sometimes sold by auction, the buyer taking the risk of pearls being in them or not. Each boat carries twenty men, of which ten are divers, and ten row, and further all other necessary operations, as assisting the divers in, &c., &c. Besides these, there is a chief boatman, termed the tindal, who acts as pilot, and is placed in authority. Five divers descend at a time, and when they come back to the surface, the other five that have been waiting go down. This gives them time to rest, and keeps the fishing constantly going on. Each diver is provided with a net attached to his waist, in which he puts the oysters as soon as he has gathered them off the rocks, and he has also a stone attached to a loop, made of rope, in which he inserts his foot; this is to facilitate his descent. A rope from the boat is also attached to the stone, and when the diver wishes to ascend he takes his foot out of the loop, and the stone is drawn up after him by the boatmen. The divers generally fill their ears with cotton, and they hold their nostrils tightly with one hand while under water. They have another rope attached to them, also, which they shake when they have been under the surface long enough, and they are then drawn up by it into the boat. They generally make from forty to fifty plunges a day, remaining under water from a minute and a half to two minutes at a time, and bring up about one hundred oysters each plunge. The chief danger the divers fear is caused by the ground-sharks; and they will not go into the water until these are supposed to be charmed away by priests or conjurers, known by the name of Pillal Karras, or "binders of sharks," in the Malabar language; one of which fraternity is attached to each boat. During the time that the fishery is being prosecuted, the priests remain on the shore, praying, distorting their bodies in strange attitudes, and using various forms and ceremonies. Occasionally the conjurer accompanies the boat to which he is attached, and then the diver fears nothing, and will dare anything so long as he remains with them. The priests are paid by the company, and the divers by a share in the quantity of oysters caught, or in money, according as they fancy. When the oysters are taken out of the beds, they are buried in deep holes or pits, being covered first with matting and then with earth, and left to die and decompose, when they open naturally, and the pearls are obtained. It is said that the stink occasioned by the putrefying oysters is so great as to taint the atmosphere for miles round. The pearls found at this fishery are whiter than those found elsewhere, and are, consequently, more valuable in the European markets. After being taken out of the oysters, they are cleaned, and then drilled and strung by the black people, who perform these operations very rapidly. A powder is made out of the pearls themselves to polish them; and doing this creates an extensive trade in and around Colombo, in Ceylon. Pearls are very valuable. The best are of clear bright whiteness, free from spot or stain, and with their surface naturally smooth and glossy. The largest reach the highest prices; and those of a round form are preferred, although those of the pear shape are extensively used for earrings. *Seed Pearls* are those about the size of small shot. These latter are usually exported to China, which does an extensive trade in them. The most valuable pearl that is recorded is one purchased by Tavernier, at Catifa, in Arabia, the price being £110,000; its diameter was a little more than half-an-inch, and its length upwards of two inches. The value of pearls has somewhat deteriorated in the present day, in consequence of the improvement made in their artificial manufacture. The best imitation ones are those of a Frenchman named Jacquin, who formed them by covering the inside of glass beads with a peculiar composition termed *essence d'orient*, made out of the scales of the bleak, or blay.—Ref. *Eng. Cyclopædia.*

PEARL OYSTER. (*See* OYSTER and PEARL.)

PEBA, one of the Armadillos, found in Brazil. (*See* ARMADILLO.)

PECCARY, *pek'-kă-re*, (*Dicotyles*,) an animal belonging to the fam. *Suidæ*, and common in South America. According to the description of Cuvier, the intermediate toes are larger than in *Sus*, (*see* HOG,) and touching the ground. The grinders and incisors are very similar to those of the hog, so called, but the canines, directed like those of animals in general, do not project from the mouth. There is no tail, and there is a glandular opening upon the loins, where a fœtid odour is secreted. The metatarsal and metacarpal bones of the two great toes are soldered together into a sort of common bone, like those of the *ruminantia*, with which their stomach, divided into several sacs, gives them almost a remarkable relation. The dental formula may be thus expressed:—

$$\text{Incisors, } \frac{4}{6}\text{; canines, } \frac{1-1}{1-1}\text{; molars, } \frac{6-6}{6-6}\text{; tot. 38.}$$

Only two species are known, which were discovered by Azare—namely, *Dicotyles torquatus*, or collared peccary, and *Dicotyles labiatus*, or white-lipped peccary. The first species inhabits the eastern side of South America, and frequents the forests there, living on vegetables and roots. Its hairs are alternately ringed with black and yellowish-white. They are stiff in the dried skin, having the rigidity of bristles; and along the neck and back they are very long, and form a kind of bristly mane, which is erected on the slightest irritation. Fernandez describes the flesh as very like pork, but harder, and not so sweet; and that the food of the animal consists of acorns, roots, and mountain fruits, as well as worms and earthworms, besides similar insects. The *white-lipped peccary* is considerably larger than the last-mentioned variety, and is conspicuous for the white margin of its lips. The hair on the body is brownish-black, marked with rings; and the mane and hair about the head are nearly so long as to conceal the ears. The white-lipped peccary is an inhabitant of Paraguay, and is often three feet and a half in length, while its weight frequently exceeds 100 lb. They are gregarious, and traverse whole districts, which they lay waste, led by some old male. When any obstacle intervenes to their passage, they stop, and appear to hold a deliberation; but as soon as one has passed, the whole troop follow, swimming rivers, no matter how broad or swift, and climbing banks and hills with ease. When attacked, they readily turn on their pursuers, and, from their numbers, and the power they have both with their tusks and teeth, often prove dangerous enemies. At night they are fond of getting at the hollows of fallen decayed trees, each backing at the tree, and the last acting as sentinel, with his snout projecting from the entrance.

PECTEN. (*See* ESCALLOP.)

PEDICULUS, *pe-dik'-u-lus*, (Lat.,) is a gen. of insects belonging to the ord. *Aptera.* These insects are generally known by the name of Lice, and form the order of *Parasita* of Latreille, and *Anoplura* of Dr Leach. Each species of mammal and bird has its own particular species of louse, and sometimes even two or three distinct species. (*See* LOUSE.) The Linnæan genus of *Pediculus* is now subdivided into several genera; as *Pediculus*, *Phthirus*, *Hæmatopinus*, *Nirmus*, *Ricinus*, &c.

PEECHI. (*See* ZEBRA, BURCHELL'S.)

PEEWIT. (*See* LAPWING.)

PEGASUS, *peg-ă-sus*, a genus of lophobranchiate fishes, allied to the hippocampus or sea-horse, and the pipe fishes. They have very wide pectoral fins, and are found in the Javanese seas.

Pekan. (*See* Woodshock.)

Pelican, *pel′-e-kăn*, (Gr. *pelekan*) (*Pelecanus*,) a bird, according to Cuvier, belonging to the fam. *Topipalmatæ*, of the ord. *Palmipedes*, a class of swimming birds or *Natatores*. The characteristics, taken from the description of Temminck, are as follows :—Bill long, straight, wide, and very much depressed ; upper mandible flattened, and terminated by a very strong hook or nail, which is compressed and very much bent ; lower mandible formed by two osseous branches, which are depressed, flexible, and united at the point, and from which a naked skin, in the shape of a bag, is suspended. The face and throat are naked ; the nostrils basal, in the shape of longitudinal slits ; the feet short and strong ; three anterior toes, the hind toe articulated anteriorly, but on the same plane with the others, and all united by a membrane, the middle claw being without dentilations. The wings are moderate in size ; the first quill-feather shorter than the second, which is the longest in the wing ; and the greater wing-coverts and the secondaries are, nearest the body, as long as the quills. The pelicans reside on rivers, lakes, and along the sea-coasts ; they are also excellent swimmers, and are fond of perching on trees and other eminences. They feed on fish, and by means of their pouch they can store up a good deal of provender in one evening, when they return to their favourite haunts and disgorge their prey from their pouch to consume it at leisure. The female feeds her young on food that has been macerated for some time in her pouch. The common pelican (*Pelecanus onocrotalus*) is about five or six feet in length, and the expanse of the wings is from twelve to thirteen feet. The colour of the plumage is generally white, tinted with rose or salmon-colour, which is brightest in the breeding season. The primaries and spurious wings are black, and the crest at the back of the head yellow. The pouch is yellow, the irides hazel, and the feet flesh-colour ; the tail is short. The name of the pelican is derived from its cry, which is loudest during its flight, and which the ancients used to compare to the braying of an ass. It inhabits Asia, Africa, and South America. In September, about the middle of the month, it repairs to Egypt ; and in the summer months it takes up its residence along the borders of the Black Sea and the shores of Greece. With regard to its fishing and eating powers, it is said that a pelican will despatch as many fish at a single meal as would serve for six men ; and in confinement it is known to snatch up rats and other small quadrupeds. It reposes at night standing up, with its head leaning on its breast. The absurd idea which used to be prevalent that the pelican fed its young with its own blood, was doubtless derived from its habit of feeding them from the fish in its pouch. It also carries water in its pouch for the succour of the young pelicans, which are generally two in number at a time.

Penguin, *pen′-gwin*, (Welsh *pen*, head ; *gwyn*, white ; or from the Latin *pinguis*, fat,) a term applied to it on account of its appearance. According to Cuvier, the penguins (*Aptenodytes*) are even less capable of flying than the auks. Their little wings are covered with mere vestiges of feathers, which, at the first glance, resemble scales ; their feet, placed further behind than those of any other bird, only support them by bearing on the tarsus, which is widened like the sole of the foot of a quadruped, and in which are found those bones soldered together at their extremities. They have a small thumb directed inwards, and the three anterior toes are united by a membrane. They are only found in the Antarctic seas, never going on shore except to build their nests. They can scramble along the ground with some speed, using their short wings as if they were legs, and, in consequence, they lie nearly flat while running. In leisurely walking, they shuffle slowly along. While in the water they move with great swiftness, and they principally feed on fish. The female lays from two to three eggs at a time, which are generally all hatched. The largest of the species is the great Patagonian penguin (*Aptenodytes Forsteri*), which is about two feet long, and weighs upwards of seventy pounds. On the places where they breed, they are seen in countless numbers lining the shore ; and at a distance, from their erect attitudes, they might be mistaken for an army ready to meet invasion. They are simple, inoffensive birds, and may be knocked down easily, never stirring on the approach of the destroyer.

Perameles. (*See* Bandicoot.)

Perch, *pertsh*, (Fr. *perche*, Lat. *perca*,) an acanthopterygious fish, belonging to the fam. *Percidæ*. Its characteristics are :—Two dorsal fins, distinct and separated ; the rays of the first spinous, those of the second flexible ; tongue smooth ; teeth in both jaws in front of the vomer, and on the palatine bones ; operculum bony, ending in a flattened point directed backwards ; branchiostegous rays seven in number ; and the scales rough, hard, and firmly attached. The perch is one of the most common and beautiful of our fresh-water fish. The upper part of the body is of a greenish-brown, subsiding into golden yellow below ; the sides ornamented with dark transverse bands ; the irides golden ; the dorsal and pectoral fins pale brown, and the anal and caudal fins bright vermilion. The perch was known to the Greeks as Aristotle has described its habits. In England, it is found in nearly every river and lake, and it is common enough in the temperate parts of Europe. It varies in weight from half-a-pound up to three pounds, although several have been taken over the latter weight. Many other fishes are popularly, though wrongly, called perches. For example, there is the Climbing Perch of Ceylon, (*Anabas*,) which can walk over land, and even can ascend trees by means of its fins ; the Giant Perch of Eastern Europe, (*Lucio perca*,) which smoetimes exceeds a yard in length ; together with many others.—*Ref.* Yarrell's *British Fishes*.

Perdix. (*See* Partridge.)

Pericardium, *pe-ri-kar′-de-um*, (Gr. *peri*, about, and *kardia*, the heart,) in Anat., is the membrane that incloses the heart (which *see*).

Periosteum, *per-e-os′-te-um*, (Gr. *peri*, and *osteon*, a bone,) in Anat., is the membrane that covers the bone. (*See* Bone, Anatomy.)

Peritoneum, *pe-ri-to-ne′-um*, (Gr. *periteino*, I stretch round,) in Anat., is the thin serous membrane lining the abdominal cavity, and enveloping the contained organs, so as to keep them in their proper places Like the other serous membranes, it is an inclosed sac, covering, but not containing, the organs in its cavity, with its internal surface smooth and shining, and moistened by a serous fluid for aiding the natural movements of the organs upon each other. The folds which surround the small intestines constitute the mesentery; that which hangs down from the stomach, and is then reflected upwards and backwards to the colon, is the omentum. The peritoneum is liable to inflammation, exceedingly painful and dangerous, from its extent and connexion with important organs. Peritonitis may exist either as an acute or chronic disease. In the former, there is usually great pain and tenderness of the abdomen, accompanied with fever, and a frequent, small, and hard pulse. Sometimes, at first, the pain is confined to one spot; but it generally soon extends over the whole of the abdomen. It is very severe, and much increased by any motion, even coughing, sneezing, or drawing a long breath. Even the weight of the bed-clothes is sometimes unbearable. It is acute and cutting, and sometimes occurs in paroxysms; and the patient usually lies on his back with his knees drawn up. The bowels are usually constipated, but sometimes the reverse; and commonly there are present nausea, vomiting, and hiccup. Its causes are various, as by cold, mechanical injuries of the peritoneum, the development of tumours, &c. Women in childbed are peculiarly liable to it. After the disease has continued for a certain time, it is attended with tension and swelling of the belly; and if not checked, it usually terminates in from five to ten days. The appropriate treatment, when the state of the patient admits of it, is copious general bleedings, followed by the application of leeches to the abdomen, together with warm fomentations; frequently the latter is all that the state of the patient admits of. As internal remedies, most reliance is usually placed upon mercury and opium. After a time, peritonitis sometimes assumes a chronic form. Here the symptoms are less marked. The pain is slight, or only discoverable on pressure, and the fever low; but the skin is hot and dry, the tongue foul, and appetite impaired. The treatment is local bleedings, with blisters and other counter-irritants applied over the abdomen. A nourishing, but unstimulating, diet, and attention to the state of the bowels, are likewise necessary; and some recommend iodine, either taken internally or applied as ointment to the part.

PERIWINKLE, *per-e-win'-kl*, (Sax. *peruince*,) a marine animal, belonging to the *Littorindæ*, a fam. of *gasteropodous* mollusks living in the sea or in brackish water. The shell of the periwinkle is not smooth, but is solid, and its whorls are more or less flattened instead of being rounded. Great quantities of this mollusk are sold in London and about the coasts every year.

PETAURISTS, *Pet-or'-ists*, a group of marsupial animals, found in Australia, and belonging to the Phalangists, *q. v.* They are distinguished by the arrangement of the teeth. (*See* HEPOONA ROO.)

PETREL, *pe'-trel*, (*Thalassidroma*,) a bird belonging to the ord. *Natatores*, and fam. *Loridæ*. It is one of the smallest web-footed birds known, and is only six inches in length. The *stormy petrel*, which is better known to mariners under the title of "Mother Carey's chicken," may be thus described:—The bill is black; he irides dark brown; the head, neck, back,

wings, and tail, sooty black; outer edge of tertial feathers white; chin, throat, breast, and under surface of the body, black; sides of the vent white; and legs, toes, and membranes black. It breeds on the Lowe Isles, Iceland, and the Scilly Isles, and roves at large over the greater portion of the Atlantic. Its food consists of small fish, and those crustacea and mollusca which are found in the floating seaweed which may be seen over many parts of the ocean. It often keeps in company with a ship for days, not only for shelter, but for scraps of provisions thrown overboard. Sailors superstitiously believe, that when Mother Carey's chickens are seen flying about, it is a sign that a storm is coming. According to Selby, the following are the characters of the petrels, or family *Thalassidroma*:—Bill shorter than the head, much compressed in front of the nasal sheath, with the tip of the upper mandible suddenly curving, and hooked downwards; and that of the lower one slightly angulated, and following the curve of the upper. The nostrils are contained in one tube or sheath, but show two distinct orifices in front. The legs have the tarsi rather long, slender, and reticulated. The feet have three toes, united by a membrane; the outer and middle toes are nearly equal in length, the hind toe being represented by a small, straight, dependent nail. The wings are long and acuminate, and the tail either square or slightly forked. The name Thalassidroma signifies "sea-runner." Besides the stormy petrel, which has been just described, there are other varieties; as Bulwer's petrel, (*Thalassidroma Bulwerii*,) which is a native of Madeira, and is about ten inches long; Wilson's petrel, (*Thalassidroma Wilsoni*,) which breeds about Nova Scotia, (its length is about seven and a half inches;) the forked-tailed petrel, (*Thalassidroma Leachii*;) and the fulmar petrel, (*Procellaria glacialis*.) This bird is extremely valuable, on account of a pure, amber-coloured oil which it produces in large quantities, the best being obtained from the old birds. The eggs are also used as food. The albatros is allied to the petrels.

PETROMYZON. (*See* LAMPREY.)

PETTICHAPS, *pet'-ty-chaps*, a popular name given to one or two birds belonging to the genus Sylvia. The garden whitethroat is called the Great Pettichaps, and the chiff-chaff is named the Smaller Pettichap.

PHÆTON. (*See* TROPIC-BIRD.)

PHALANGES, *fál-àn-jeez* (Gr., a battalion), in Anat., is the name given to the small bones of the fingers and toes. (*See* FOOT, HAND.)

PHALANGISTS, *fal'-an-jists*, a group of marsupial animals found in Australia. They have the skin of the flanks expanded, like that of the flying squirrel, and are thereby enabled to make extraordinary leaps from one tree to another, spreading out their limbs, and upborne by the flattened skin, which reaches along all four legs. There are many species belonging to this group, which are popularly, but erroneously, called flying opossums, flying mice, and flying squirrels.

PHALAROPES, *fal-a-ro'pes*, certain birds belonging to the family Scolopacidæ, *q.v.*

PHARYNX, *făr'-inks*, (Gr., the throat, from *phero*, I convey, because it conveys food into the stomach,) in Anat., is the muscular funnel-shaped bag at the back part of the mouth, which receives the masticated food, and conveys it to the œsophagus. It is broadest about the middle, being constricted at either end, more particularly below, where it terminates in the œsophagus. Pharyngitis is inflammation of the pharynx; pharyngotomy, the operation of cutting into the pharynx for the purpose of extracting any foreign body.

Phatagin, *fat'-a-jin*, a species of manis, with a very long tail. (*See* Manis.)

Pheasant, *fez'-zănt* (Lat. *phasianus*, Fr. *faisan*) (*Phasianus*).—The generic characters of the pheasant, according to Mr Yarrell, are as follows:—Bill of moderate length and strong, the upper mandible being convex, naked at the base, and with the tip bent downwards; nostrils basal, lateral, and covered with a cartilaginous scale; cheeks, and the skin surrounding the eyes, destitute of feathers, and with a red varicose covering. Wings short; the first quill-feather narrow towards the tip; the fourth and fifth the longest in the wing. Tail long, wedge-shaped, graduate, and containing eighteen feathers. Feet with three toes in front and one behind; the three anterior toes united by a membrane as far as the first joint, and the hind toe articulated upon the tarsus, which, in the male birds, is furnished with a horny conical and sharp spur. The pheasant was originally a native of the banks of the Phasis, a river of Colchis, in Asia Minor; whence it was brought by the Greeks into Europe, where it speedily began to be held in high request, both for the beauty of its plumage and its succulent qualities as an article of food for the table. The pheasant is extensively diffused through England, and has become naturalized even so far north as Northumberland. Mr Selby observes, however, that the cause of its preservation is not so much due to the wildness of its nature, as to the trouble and expense bestowed on it by noblemen and other considerable landed proprietors, without which the breed would most likely be now extinct. The favourite resorts of pheasants are woods that are thick at the bottom, with long grass kept up by brambles and bushes, and thick plantations, or moist grounds, and marshy islands overgrown with rushes and osiers. They can seldom be induced to remain for any length of time on any ground bare of shelter, as wood and water are indispensable to them, on account of their habits. The females begin to lay their eggs in April, and hatch them by the end of May. They lay generally from ten to fourteen, and the eggs are of a uniform olive-brown colour, and nearly spherical in shape. The pheasant chiefly feeds, in a wild state, on grain, seeds, green leaves, and insects, as well as some berries, of which they are fond; as blackberries, &c. They seldom use their wings, except to get away from an enemy; but generally run along; and the speed with which they get over the ground is somewhat surprising. The ordinary weight of a pheasant is from two pounds to two pounds and a half, although many of heavier weight have been killed. The whole length of the male is about three feet, while that of the female is about two, although the length greatly depends on that of the middle feathers of the tail, which often exceed two feet. The colour of the adult male is much varied. The ears are surrounded by a naked skin of bright scarlet, speckled with bluish-black; the irides hazel; the head and neck steel-blue, reflecting brown, green, and purple in different lights; the ear-coverts dark brown, upper part of back orange-red tipped with black; tail-feathers very long, of pale yellow-brown colour, with narrow transverse bands of black, about an inch apart; the breast and under surface of the body golden-red; and finally, the legs, toes, and claws of a brownish lead colour. The females have a dull brownish earth colour plumage, and sink far below the male in appearance; but it is to this that they owe their escape from the sportsman; whence they can rear and bring up their broods in safety, without running those risks which the male has to undergo. It may be remarked, in conclusion, that the pheasant has a marked inclination to breed with other gallinaceous birds; as the common fowl of our poultry-yard, the turkey, &c.—*Ref.* Yarrell's *British Birds.*

Philomachus. (*See* Ruff.)

Pholas, *fo'h-las*, a genus of bivalve shells, popularly called Piddocks, and remarkable for their power of boring into stones and wood. They make deep burrows in the cliffs, and thus aid in causing the rocks to fall; while there are some species which prefer wood as a resting place, and do very great damage to submerged timber. The outside of the shell is formed like a file, and is probably the tool which is used in boring the holes.

Phoca. (*See* Seals.)

Phocæna. (*See* Dolphin.)

Phyllium. (*See* Leaf-Insect.)

Physalis. (*See* Portuguese Man-of-War.)

Physalus. (*See* Rorqual.)

Physeter, *fy-zee'-tur*, a species of whale, called by seamen the Black-fish. In general shape it resembles the spermaceti whale, but may be known by the position of the spout-holes, which are placed on the top of the head, and nearly in the centre. It is a large animal, measuring from fifty to sixty feet in length.

Physiology, *phiz-e-ol'-o-je*, (Gr. *phusis*, nature, and *logos*, discourse,) is literally the doctrine or science of nature, comprehending a knowledge of all the physical and natural sciences; and this was the meaning which it originally bore. But as these, in course of time, came to be more particularly studied, they received distinct names, as natural philosophy, chemistry, astronomy, zoology, geology, &c. To the science which treats of the functions of living beings the term physiology is still applied, though its meaning is becoming more and more restricted as its various branches become better defined. It is divided into animal or comparative physiology, which treats of animals, and human physiology, which deals with man. By physiology, as at present used, is generally understood a knowledge of vital actions in a state of health, as distinguished from pathology, which is a knowledge of the same functions when diseased. It is, indeed, impossible exactly to lay down the boundaries which separate health from disease; for we even find that what is health to one man may be disease to another; yet the general features are sufficiently marked. Physiology, then, is generally considered to embrace a description of the various vital functions of the parts composing the human body, as well as the more intimate structure of the parts themselves; the relations of these parts to each other being referred to descriptive anatomy, and their chemical composition to animal chemistry.

The modern science of histology deals with the elementary textures of the human body and their several functions, and is the recognised basis of physiological knowledge. The ultimate or elementary tissues are arranged as—(1) molecule-tissues, (2) cell-tissues, (3) fibre-tissues, and (4) tube-tissues. Molecules are minute bodies, presenting to the microscope the appearance of minute dots or points. All fluids out of which the higher tissues are formed are rich in molecules. When we examine living structures under high magnifying powers, numerous tissues, but especially the fluids, are seen to contain multitudes of minute vesicles or shut sacs, termed cells, which vary greatly in shape, size, and function, and are distinguished into permanent cells and cells of transition. Cells undergo a variety of changes; sometimes they gradually dissolve and perish, or the cell-wall bursts and liberates its fluid contents; and they unite in various ways to form complex tissues. A fibre is a solid elongated body like a thread, varying in thickness from one sixteen-thousandth to one fourteen-thousandth of an inch. The functions of the fibrous tissues are manifold; the most important, however, is that of contractility. The tubular tissues are distinguished from fibres by being composed of distinct walls, with contents, as in the nerve-tubes, and the blood-tubes or capillaries. These are the four great elementary tissues of living beings, on which depend the vital endowments of growth, contractility, and sensibility. Organised beings present us with only twenty of the sixty-two elementary substances known in chemistry; and of these the principal are oxygen, hydrogen, carbon, and nitrogen, the others being found only in small quantities and in particular tissues. The chemical principles that are to be found more or less associated together in every texture and fluid of living beings, some prevailing in one, others in another, are (1) the albuminous, (2) the fatty, (3) the pigmentary, (4) the mineral principles. The albuminous principles consist of albumen, fibrine, and caseine. Fatty matter consists of carbon, hydrogen, and oxygen in various proportions. The pigmentary principles give colour to the various textures, and are evidently allied to oily constituents of living beings. Of mineral principles the most important are carbonate and phosphate of lime. The various functions of the more complex organs of the human body are distinguished as those of nutrition, innervation, and reproduction. The function of nutrition consists of five stages,—(1) the introduction into the stomach and intestinal canal of appropriate aliment; (2) the formation therefrom of a nutritive principle, the blood; (3) the transformation of the nutritive qualities of the blood into the tissues; (4) the reabsorption of the transformed tissues into the blood; (5) the excretion of the various effete matters from the body. The subject of appropriate alimentary matters is treated under the head of FOOD AND DRINK. The digestive processes,—including mastication, or the chewing of the food; insalivation, the mixing it with saliva; deglutition, or the swallowing of it; chymification, or the action of the stomach; chylification, or the action of the intestines; and the absorption of the chyle,—are treated of under the head of DIGESTION. The chyle in the intestines is taken up by the lacteals, and by them conveyed to the mesenteric glands, where it is supposed to undergo some change. From thence it makes its way to the right side of the aorta, in the lumbar region, where it is finally discharged into an elongated pouch, called the receptaculum chyli. From this pouch the thoracic duct conveys the chyle upwards to the left side of the neck, where it is poured into the left subclavian vein, at its junction with the internal jugular; and, being thus mixed with venous blood, is carried to the lungs, and there converted into arterial blood. The circulation is carried on by means of the heart, arteries, veins, and capillaries. The blood is propelled by the heart through the arteries to all parts of the body; and from the extremities of the arteries it is taken by the capillaries to the extremities of the veins, by means of which it is again conveyed to the heart. (*See* CIRCULATION.) The impure blood returned by the veins to the heart is by it propelled into the lungs, where it is purified by being exposed to the action of the air, and again conveyed to the heart for circulation through the body. The lungs are so constructed as to expose a large surface, covered with capillary blood-vessels, to the action of the atmosphere. (*See* RESPIRATION.) We thus see how nutritive matter is converted into blood, and how the blood circulates through all parts of the body. It is from the blood that all the different tissues derive their nourishment, each possessing a vital property of attraction and selection, whereby the necessary materials are drawn through the delicate membranous walls of the capillaries, and converted into tissues. Hence a sufficient supply of nutritious blood is necessary to health, depending, as it does, upon the various processes of digestion, circulation, respiration, &c.; and also a healthy state of the parts to be nourished, so as to be able to attract and select the proper materials. A healthy state of the nervous system is also necessary, for on this, too, the various functions of the body depend. While the blood is constantly supplying matter to build up the various tissues, it is also at the same time receiving from these tissues the matter which has fulfilled its appointed functions. The new material takes exactly the place of the old, so that the general configuration of the body is preserved. The blood is thus a wonderfully complex fluid, made up partly of organic materials derived from the alimentary canal, and partly of organic materials derived from the tissues. (*See* BLOOD.) The latter are carried to various excretory organs, where they are separated and discharged; as by the intestines, kidneys, skin, lungs, and liver. The function of innervation is dependent on the brain, spinal cord, and nerves. (*See* BRAIN, NERVOUS SYSTEM, SPINAL CORD.) The third and last of these functions is that of reproduction, a subject of much interest, but comparatively little understood. It is said that the human fœtus passes through various stages of growth, resembling in turn the different inferior beings of the animal scale; at first a zoophyte, then a mollusk, then a worm, a fish, a reptile; and so on. Some, however, regard this theory as being more fanciful than real, and founded merely upon loose analogies.—Ref. *Encyclopædia Britannica;* Carpenter's *Human Physiology.*

PIA MATER, (Lat., pious mother,) in Anat., is the name given to the innermost of the three investing membranes of the brain. (*See* **BRAIN**.)

PICATHARTES. (*See* CROWS.)

PICHICIAGO, *Pitch-y-see-a'h-go,* a little burrowing animal of Chili, closely allied to the armadillos, *q. v.* It is about as large as the mole, and is remarkable for the shelly armour which covers the back, and is bent over the hind quarters. Its scientific name is *chlamydophorus truncatus.* The under part of the belly is clothed with thick and soft fur.

PIDDOCK. (*See* PHOLAS.)

PIE. (*See* MAGPIE.)

PIG, GUINEA. One of the Cavys, *q. v.*

PIGEONS, *pij'-unz,* (Fr.,) one of a nat. fam. of birds comprising the pigeons, doves, and turtles. Much doubt seems to prevail as to the proper place of the pigeons in the system; some ornithologists having placed them among the *Insessores,* or perching birds, and others among the *Rasores,* or gallinaceous birds; whilst others again group them as a separate order between the two. Their food, habits, internal economy, and the formation of their bills, identify them with the *Rasores;* while, on the other hand, the characters which bring them near the *Insessores*—their divided toes and comparatively short legs—are weakened by the resemblance which those members bear to the same parts of the contiguous order in their general structure. The distribution of the family is very extensive, the family occurring almost everywhere except within the frigid zones. The species are most abundant in Southern Asia and the great Indian archipelago. Its general characteristics are—bill moderate, compressed, covered at the base of the upper mandible with a soft skin, in which the nostrils are pierced, and more or less curved at the point; feet with three divided toes in front and one behind. One part of the internal organisation of the pigeon is worthy of special notice. The crop, in the state which is adapted for ordinary digestion, is thin and membranous, and the internal surface smooth; but by the time the young are about to be hatched, the whole, except that part which lies on the trachea, becomes thicker and puts on a glandular appearance, having its internal surface very irregular. In this organ it is that the food is elaborated by the parents before it is conveyed to the young; for a milky fluid of a greyish colour is secreted and poured into the crop among the grain and seeds undergoing digestion, and a quality of food suited to the nestling is thus produced. The fluid coagulates with acids, and forms curd; and the apparatus forms amongst birds the nearest approach to the mammæ of warm-blooded animals. The number of vertebræ amounts to 13 cervical, 7 dorsal, 13 sacral, and 7 caudal = 40. The sternum is narrow, with a deep keel, the inferior border convex, and the anterior one curved forwards, thin, and trenchant; the manubrial process is strong and bifurcated, the costal processes short. The posterial margin is cleft by two fissures on either side of the mesial plane, the lateral and superior fissures being the deepest; the mesial ones are occasionally converted into a foramen. The costal surface of the lateral margin is, as in the gallinaceous birds, of very little extent. The domestic pigeon is supposed to be derived from the œnas or stock-dove, and has been the companion of man from a very early period, the ancient Greeks having been well acquainted with them; whilst the breeding of them amongst the Romans was quite a science. The same attention to them has been given by modern nations, and the adepts in the art of breeding them pretend that the almost innumerable varieties may be bred to a feather. The names bestowed on those varieties are indicative of their peculiarities; as *tumblers, croppers, runts, carriers,* &c. In their wild state, pigeons—then called in England wood-pigeons —live on high trees, sometimes in flocks. They feed on seed, though sometimes on fruit, retaining their food in the crop for some time. The greater proportion of the species build on elevated situations, forming a loose nest of small twigs, and wide enough to contain both sexes; the female lays two eggs several times a year. They pair for life, though they assemble in flocks. They have no song, their note being a simple cooing. The prevailing colour of the pigeon is bluish-grey, of various intensities and shades, frequently embellished upon the neck with feathers having a metallic lustre and peculiar form, and which exhibit various tints of colour according to the light in which they are viewed. Their flesh is sapid and nutritious, being of a warm and invigorating nature. Their flight is powerful, very rapid, and can be long sustained; and many species are in the habit of making distant periodical migrations. The numerous varieties of the pigeon existing in England are supposed by the best authorities to have originated, not from any cross of the common pigeon with other species, but from a few accidental varieties of the common pigeon; such accidental varieties as have occasionally occurred having been separated from the parent stock, subjected to captivity and domestication, and assorted and paired together as fancy or caprice suggested. Our limits will not permit us to describe them fully. The *carrier,* however, deserves notice, if it were only for the fact that it is honourably noticed by some of the most famous writers of classical antiquity. Anacreon, the great Greek lyric poet, has mentioned it as the bearer of epistles; Pliny, the famous Roman naturalist, speaks of the communication kept up between Hirtius and Decimus Brutus at the siege of Mutina, (Modena;) and there is recorded an instance of their having been employed during the crusade of St Louis. It was at a very early period employed in this country as a conveyor of messages. Another prominent species of pigeon is the *passenger*-pigeon, a native of North America, over nearly the whole of which immense continent it occasionally rambles, the country to the west of the Rocky Mountains only excepted. It arrives in the fur countries in the latter end of May, and departs in October. It annually attains the sixty-second degree of latitude in the warmer central districts, but reaches the fifty-eighth parallel, on the coast of Hudson's Bay, in very fine summers only. They migrate in huge flocks, which have sometimes been known to be considerably over two hundred miles in length, and to consist of two thousand millions of pigeons. Their roosting-places are always in the woods; and when they have frequented one of these places for some time, the appearance it exhibits is surprising. The ground is covered, to the depth of several inches, with their dung; all the tender grass and underwood is destroyed; the surface is strewed with large limbs of trees broken down by the weight of the birds collecting one above another; and the trees themselves are killed through an extent of thousands of acres as completely as if they had been cut down by an axe. The marks of their desolation remain for many years on the spot, and long after they have departed scarcely a vegetable makes its appearance.

PIGS, *pigs*, the young of swine. Under the article HOG, the distinctive features of this pachydermatous family will be found described. For its size, the pig is one of the most useful animals in creation, as nearly the whole of its body is used for food, and there is no part of it which cannot be turned to account. Its fat is made into lard, which is not only used by housekeepers, confectioners, &c, but also largely in medicine. The flesh is eaten both fresh and salted. The skin, when not eaten with the flesh, is tanned for saddle-seats, shoes, pocket-book covers, &c. The bladders are prepared as ox-bladders. The bristles are used for making brushes. The abdominal fat, the blood, and even the intestines, are used for food. Lastly, the pig multiplies its species in a degree proportional to its usefulness. The principal breeds of English pigs have been generally named from the counties or localities where they have for the most part been reared. Those approved on account of their superior size, and consequently reared for the purpose of making bacon, are the Berks, Hants, Hereford, Salop, Norfolk, and Chester breeds. The breed best adapted for table pork is the small white Chinese. Particular breeds are, however, preferred by different individuals.

PIKE, *pike*, (*Esox Lucius.*)—The generic characters of this fish are,—head depressed, large, oblong, blunt; jaws, palatine bones, and vomer, furnished with teeth of various sizes; body elongated, rounded on the back; sides compressed, covered with scales; dorsal fin placed very far back over the anal fin. It is a well-known inhabitant of the principal rivers and lakes of Europe, and has long been common in many of the rivers, and almost all the lakes and ornamental waters of Great Britain, where, in the Middle Ages, it was held in high estimation; its value in the thirteenth century, for instance, being estimated at ten times that of the best turbot or cod. The pike is strong, fierce, and active; swims rapidly, and occasionally darts along with the rapidity of lightning. The spawn is deposited among weeds early in April; and at this season the spawning fish is found in narrow creeks and ditches connected with the larger waters they at other times inhabit. The young are said to reach the length of eight or ten inches the first year; twelve to fourteen the second; eighteen to twenty inches the third; and there are proofs on record that from this last size the pike, if well supplied with food, will grow at the rate of four pounds' weight a year for six or seven successive years. One of the chief characteristics of the pike is its extraordinary voracity, anecdotes respecting which are almost innumerable. In default of a sufficient number of other fishes to satisfy them, they will seize upon moor-hens, ducks, and, indeed, any animals of small size, whether alive or dead; and it is by no means unusual for them to destroy themselves by endeavouring to swallow prey too large for their throats. They are also remarkable for their length of life and the great size they frequently attain. They are known to attain, in some instances, the age of a hundred years: and pike of sixty or seventy pounds' weight, although not common, are by no means extraordinary. The flesh of the pike is of good quality; and those of the Medway, when feeding on the smelt, acquire excellent condition, with peculiarly fine flavour. Among the various localities in England famous for the quality as well as the quantity of their pike, are Horsea Mere and Heigham Sounds, two large pieces of water in the county of Norfolk, a few miles north of Yarmouth. The colour of the head and upper part of the back of the pike is dusky olive-brown, becoming lighter, and mottled with green and yellow, on the sides, passing into silvery white on the belly; pectoral and ventral fins pale brown; dorsal and caudal fins darker brown, mottled with white, yellow, green. Several other fish are popularly known under the name of pike. The American pike, (*Centropomus undecimalis*,) is closely allied to the perch. It is found in various parts of the world, extending along the Atlantic shores of America where the water is warm. It is a large fish, very good for the table, and is green on the back and silvery-white on the abdomen. The bony pike, (*Lepidosteus*,) a most remarkable fish, which belongs to the order Ganolepidoti, and which is found in the American lakes. Its body is defended by a complete armour of hard, bony scales, each of a lozenge-like shape, and smooth and polished like porcelain. The jaws are very long and narrow, and are filled with long, sharp teeth, from which circumstances, and from the shape of its body, it is called the Bony Pike. Its flesh is good, and as it reaches a length of four or six feet, it is a valuable fish.

PILCHARD, *pil'-tshard*, (*Clupea Pilchardus*,) is the name of a fish belonging to the family of the *Clupeidæ*, and much resembling the herring. It is about nine inches in length, with large scales; the back is bluish, and the sides and belly silvery; the head is compressed, and the mouth without teeth. The upper angle of each of the gills is marked with a large black spot. The length of the head is to the whole length of the body as one to five; the depth of the body equal to the length of the head; the transverse thickness of the body equal to half its depth. The older naturalists considered the pilchard, like the herring, as a visitor from a distant region, and assigned to it the same place of resort as that fish; but to this it is objected that the pilchard is never seen in the Northern Ocean; and that, though they frequent the French coasts, and are seen on those of Spain, they appear on neither in considerable numbers or with much regularity. On the coast of Cornwall they are found through all the seasons of the year; but in January they keep near the bottom, and although in March they sometimes assemble in great numbers, it is not until July that they regularly and permanently congregate. The season and the situation for spawning, and the choice of food, are doubtless the chief causes which influence the motions of the great bodies of these fish; and when these are thoroughly known, the variations which have been noticed in the actions of the pilchard will probably no longer be a mystery. The pilchard feeds with voracity on small crustaceous animals, and especially on a minute species of shrimp, not larger than a flea. It is probable, also, that they devour the roe of fish. When the pilchards assemble off the Cornish and Devonshire coast, they resemble, says Mr Yarrell, a mighty army, with its wings stretching parallel to the land, and the whole composed of numberless smaller bodies, which are perpetually joining together, shifting their position, and separating again. There are three stations assumed by this great body,—one to the eastward of the Lizard, the most eastern extremity reaching to the Start Point in Devonshire; a second between the Lizard and the Land's End; and a third on the north coast of Cornwall, the chief station being about St Ives. Sometimes one of these districts is full of fish, whilst there are none in the others; but towards the end of the season they often move from one station to another. Their subordinate motions are much regulated by the tide, against which they rarely go; and sometimes, after they have remained parallel to the coast for several weeks, at a distance of several leagues, a strong tide will bring them close to the shore. The fishery for pilchards, which commences in July, and continues until the short days and stormy weather of the equinox render its prosecution impracticable, is carried on by drift or driving-nets, and with seans; the former consisting of a number of nets, commonly about twenty, each from eighteen to twenty fathoms long and seven fathoms deep, and sometimes reaching three-quarters of a mile. The fishery begins a little before sunset, and the nets are drawn in about two hours, to be again shot as morning approaches, pilchards entering the nets better at these seasons than at others. The number of fish taken by drift-boat varies exceedingly. From 5000to 10,000 is considered moderate; but the number often amounts to 20,000. 150,000 is considered a fair number for the season's fishing. For the sean-fishing three boats are provided, of which two are about forty feet long and ten wide at the beam, with flat timbers and a sharp bow. The first is termed the sean-boat, and is furnished with a sean 220 fathoms in length and 12 fathoms deep, which is buoyed along the head-rope with corks and weighed down with leads. The second boat, called the volyer, (a corruption, probably, of follower,) has a sean from 100 to 120 fathoms in length, and 18 fathoms in depth in its deepest part, and termed the tuck-sean, differing from the stop-sean, as the former is called, as well in shape as in dimensions, the middle being formed into a hollow or bunt. A third boat, called a lurker, is less than the others, and has no sean. The crew attending a sean consists of eighteen men and one or two boys. Seven of these are assigned to each of the larger boats, and the remaining four, including the master, to the lurker. This fishery commences three weeks or a month after the drivers. The three boats proceed in the afternoon to some sandy bay, and cast anchor, waiting for the appearance of the fish. When this is discovered, the lurker proceeds to the place to make observations, and when everything is favourable, a warp from the end of the sean is handed to the volyer, whose place it is to keep all taut, the lurker continuing on the fish to watch their motions, and to point to the sean-boat what is to be inclosed. The sean-boat is rowed by four men, the other three being employed in throwing the net. The sean at first forms a curved line across the course of the fish; and while the two larger boats are employed in warping the ends together, the lurker's station is the opening, where, by dashing the water, the fish are kept away from the only place of escape. When the sean is closed, and the ends are laced together, if the body of fish be great, and the sea or tide strong, the net is secured by heavy grapnels, which are attached to the head-ropes by hawsers. When the evening has closed in and the tide is low, the men proceed to take up the fish. For this purpose, leaving the stop-sean as before, the volyer passes within it, and lays the tuck-sean round it on the inner side; it is then drawn together, so as gradually to contract the limits of the fish and raise them from the bottom, stones being repeatedly thrown into the water at the part where escape alone is practicable, until the fish are supported in the hollow or bunt of the sean. When brought to the surface, the voices of the men are lost in the noise made by the fish as they beat the water. The seaners fix themselves in pairs on the gunwales of the boats, with flaskets to lade the fish on board. When the quantity inclosed in the stop-sean is large, the tuck-sean is made to inclose no more than the boats can carry, and a week may possibly elapse before the whole of the capture is secured, part being taken up every night. The pilchard is sometimes called the Gipsy Herring. In appearance it much resembles the common herring, but may at once be distinguished by holding it up by the dorsal fin. In the pilchard, this fin is set well forward, so that when balanced by it, the head of the fish points upwards. In the herring it is set rather behind the middle of the body, so that the head points downwards. As an object of adventure, the pilchard fishery is popular in Cornwall, and the inhabitants are greatly benefited by it; but the pursuit of pilchards is a species of lottery, some seans obtaining a considerable profit, whilst the greater part obtain no more than is sufficient to defray their expenses. The profit of the men depends on the share of the fish, which is divided into eight parts, of which the boat has one-eighth part, the nets three, and the men four. The boy that accompanies them is rewarded with the fish that may fall into the sea as the nets are drawn up; to secure which he is furnished with a bag-net at the end of a rod, termed a keep-net. The quantity of pilchards taken is sometimes enormous; 3000 hogsheads having been taken in one sean; and 10,000 hogsheads—25,000,000 fish—have been taken in one port in a single day. The average amount of the export of these fish from England is about 30,000 hogsheads. The term pilchard is said to be derived from *peltzer*, a name by which this fish was known to some early northern continental writers.—*Ref.* Yarrell's *History of British Fishes.*

PILEOPSIS. (*See* LIMPETS.)

PILOT-FISH, *pi'-lot*, a pretty little fish allied to the mackarel, (*Naucrates ductor*,) with a white body, banded with dark blue. It is remarkable for following the shark, and directing that fish to its prey. (*See* F. D. Bennett's Whaling Voyage.)

PIMLICO. (*See* FRIAR-BIRD.)

PINC-PINC, *pink-pink*, one of the African warblers, (*Drymoica textrix,*) which is remarkable for building a beautiful nest, something like that of the long-tailed titmouse, and having a supplementary nest on the outside, for the benefit of the male bird.

PINNA, *pi'n-na,* a large bivalve belonging to the Wing-shells, or Aviculidæ. It is moored to the rocks by a byssus of such long and strong silken threads, that gloves and other articles have been made from them.

PINTAIL, *pin-tale,* a kind of duck, (*Dafila acuta,*) which has a long and sharply-pointed tail. It is a handsome bird, with a dark-brown head and neck and pencilled back, and a snowy white breast and abdomen.

PIPE-FISH, a very common sea-shore fish, belonging to the Lophobranchiate order, *Syngnathus.* (*See* BILL-FISH.)

PIPING CROW, *pi-ping-kro,* an Australian bird, sometimes called the magpie, (*Gymnorhina tibicen.*) Its plumage is pied black and white, and it is nearly as good an imitator of sounds as the mocking-bird.

PIPIT. (*See* TITLARK.)

PIPRA. (*See* MANAKIN.)

PIRAI, *pee'-râi,* a most voracious fish inhabiting the lakes and rivers of tropical America, (*Serrasalmus piraya.*) It is thick and stout, and reaches the length of three or four feet. Its jaws are armed with teeth as sharp as those of the shark, lancet-shaped, and capable of biting great pieces out of the flesh of man or beast. Cattle, when fording the rivers, are sometimes attacked by them, and terribly bitten. The natives of Guiana use the jaw of this fish for the purpose of sharpening their tiny arrows, which are blown through the air-gun or Zarabatana, the tip of the arrow being drawn between any two teeth, and shaved to a point by their sharp edges.

PISCES. (*See* ICHTHYOLOGY, FISH.)

PITTA. (*See* ANT THRUSH.)

PLACUNA, *play-koo'-nah,* a genus of bivalve shells, popularly called window-shells, because they are so thin and transparent that in China they are employed in making windows, which look like ground glass, and are more durable. The "pearl" buttons of commerce are made from this shell.

PLAICE, *plaise,* (Fr. *plie,* Sp. *platija,*) (*Pleuronectes platessa.*)—This fish belongs to the fam. of the Flounders or Flat-fish, (*Pleuronectidæ,*) the characteristics of which are a want of symmetry in the form of the head, the position of both eyes on the same side of the head, one higher than the other, and frequently not in the same vertical line, and often unequal in size; the frequent want of uniformity in those fins that are in pairs, the pectoral and ventral fins of the under or white side being in some species smaller than those of the upper, and the whole colour of the fish confined to one side, while the other side remains perfectly white. The plaice (as well as the flounder and the dab) is known from the other flat-fish by each jaw having a single row of obtuse teeth, a spine at the beginning of the anal fin, and a rounded tail. Preferring muddy or sandy shores, and unprovided with swimming-bladders, the plaice generally keep close to the ground, where they hide their bodies horizontally in the loose soil at the bottom, with the head only slightly elevated, or swim slowly in the same position. The plaice spawns in February or March, and is considered to be in the finest condition at the end of May. Plaice feed on the soft-bodied animals generally, with young fish and soft crustacea, and have been known to attain a weight of fifteen pounds; but one of seven or eight pounds' weight is considered a plaice of large size. The length of the head compared to the whole length of the head, body, and tail, is as two to nine; the depth of the solid part of the body, without including the dorsal or anal fins, rather more than one-third of the whole length; the form subrhomboidal; the mouth and teeth rather small; the upper eye the larger, and placed rather more backwards than the lower eye, with a strong and prominent bony ridge between the orbits, and several tubercles, forming a curved line from the posterior part of the ridge to the commencement of the lateral line. The body is smooth on both sides, the scales small; the colour of the upper or right side a rich brown, with a row of bright orange-red spots along the dorsal and anal fins, and other spots of the same colour dispersed over the body; the under side entirely white. Young fish have frequently a dark spot in the centre of the red one. On the English coast the plaice is taken in abundance, generally wherever either lines or trawl-nets can be used, and is sometimes taken in almost incredible numbers.

PLANORBIS, *plane'-or-bis,* a gen. of fresh-water gasteropods, common in England, in which the shell is flattened and disc-shaped, just like a "Catherine wheel" firework.

PLANTAIN-EATERS, *plant-ane,* (*Musophaga.*)—A group of African birds allied to the colies. They feed on fruit, and their plumage is beautifully coloured with dark violet, purple, green, and red.

PLATALEA. (*See* SPOONBILL.)

PLATESSA. (*See* DAB.)

PLATYPUS. (*See* DUCKBILL.)

PLEISTOCENE, *plī'-sto-seen,* (Gr. *pleistos,* most; *kainos,* recent,) in Geol., a term applied by some to the most recent formations of the tertiary system. By the term *Pleiocene* or *Pliocene,* Sir Charles Lyell characterises that portion of the tertiary strata which lies between the Miocene and the Post-tertiary. The newer pleiocene, or pleistocene, is represented in Britain by the glacial drift, or boulder formations of Norfolk, of the Clyde in Scotland, and of North Wales. Other examples are also to be found in the cave deposits of Kirkdale, about 25 miles from York. In one cave there were found the remains of 300 hyenas, belonging to individuals of every age. According to Dr Buckland, they must have lived there. The remains of the ox, young elephant, hippopotamus, rhinoceros, horse, bear, wolf, hare, water-rat, and several birds, were also found. No less than thirty-seven species of mammalia are enumerated by Professor Owen as having been discovered in the caves of this period in the British islands.—*Ref.* Page's *Advanced Text-Book of Geology.*

PLESIOSAURUS, *ple-se-o-saw'-rus,* (Gr. *plesios,* near; *sauros,* a reptile,) the name given to a genus of extinct amphibious saurians, principally remarkable for their length of neck. Their remains are found in the formations from the muschel-kalk to the chalk inclusive; but are most common in the lias and Kimmeridge clay beds. They are closely allied to the *Ichthyosaurus,* and their general appearance must have been very hideous. The head was that of a monstrous lizard, furnished with teeth like those of a crocodile; its neck was of enormous length, resembling the body of a serpent; while the trunk and tail had the proportions of an ordinary quadruped, the ribs of a chameleon, and the paddles of a whale. The remains of five or six species of plesiosaurians have been found.

PLEURONECTES. (*See* TURBOT.)

PLOCEUS. (*See* WEAVER-BIRDS.)

PLOTUS. (*See* DARTER.)

PLOVER, *pluv'-er*, (Fr. *pluvier*, the water-bird,) the common name of several species of birds that frequent the banks of rivers and the sea-shore, belonging to the genus *Charadrius*. One species, known by the name of the Great Plover, Norfolk Plover, or Stone Curlew, is a summer visitor to this country, arriving here in April, and leaving again at the end of September or in October. As it comes from the south, it is much more numerous in the southern and south-eastern counties of England than far to the west or to the north; but its powers of wing allow it a wide range of flight. Their breeding-season commences about the second week in April, the female depositing its pair of eggs upon the bare ground, without any nest whatever. The eggs are pale clay-brown, blotched, spotted, and streaked with ash-blue and dark brown, two inches two lines in length, by one inch seven lines in breadth. The large and prominent eye in this species indicates a bird that moves and feeds by twilight, or later. Their food is worms, slugs, and insects; and they are also believed to kill and devour small mammalia and small reptiles, their stout frame and large beak being sufficiently powerful to enable them to do so. The great plover annually visits Germany, and is abundant in France, Spain, Italy, and, southward, to Africa, Madeira, and even to Southern Africa; eastward it is found in Corfu, Turkey, and the Grecian archipelago. It has also been found on the plains between the Black and Caspian seas, and in India. Its generic characters are—a strong, straight, stout beak, a little depressed at the base. Nostrils placed in the middle of the beak, extending longitudinally as far forward as the horny portion, open in front, previous. Legs long, slender; three toes only, directed forwards, united by a membrane as far as the second articulation. Wings moderate; second quill-feather the longest in the wing. Tail graduated. In the adult bird the top of the head and back of the neck are a pale wood-brown, each feather with a streak of black in the centre; the feathers of the black, wing-coverts, tertials, and upper tail-coverts, pale brown, each feather with a dark brownish-black longitudinal streak in the line of the shaft; the tail-feathers with the basal halves mottled with two shades of brown, the third portion white, the ends black. The chin and throat white; the neck and breast brownish-white; belly, sides, and flanks, almost white. The whole length is seventeen inches; the wing, from the carpal joint to the end, nine inches and three-quarters. The golden plover, (*Charadrius pluvialis*,) which is considered by ornithologists to be the true plover, is a bird of great powers of flight, and has, consequently, great geographical range. Some of the species are remarkable for assuming in the spring, and retaining during the summer, a plumage differing considerably from that which distinguishes them from the time of the autumn moult, through the winter to the following spring; and in the golden plover this alteration consists of a decided change from a dull grayish-white to black. The golden plover is found during summer breeding on the high hills and swampy grounds of the North of England and Scotland; Sutherland appearing to be one of the great breeding-stations. They annually visit Sweden, the Faroe Islands, Iceland, and Greenland; and numbers linger on the muddy shores of Hudson's Bay, and on the sandy beaches of lakes and rivers in the interior, until the hard frosts of September and October drive them away. The golden plover of Great Britain lays four eggs, which are large in proportion to the size of the bird, and very handsome, of a yellowish stone-colour, spotted and blotched with brownish-black; the length two inches, by one inch four lines in breadth. The nest is but slightly constructed, a small depression in the ground amidst the heath being usually taken advantage of, and lined with a few dry fibres and stems of grass. The young, when excluded, are covered with a beautiful particoloured down of yellow and brown; they quit the nest as soon as hatched, and follow their parents till able to fly and support themselves, which is in the course of a month or five weeks. The generic characters of this bird differ in several particulars from those of the *great plover*, the legs of the golden plover being but of moderate length, and the outer toe alone being slightly connected at the base with the middle toe, whilst the first quill-feather of the wing is the longest, instead of, as in the great plover, the second. The adult bird in its summer plumage has the beak black; the irides very dark brown, almost black; on the forehead a band of white; the top of the head, the nape of the neck, the back, wing-coverts, grayish-black; the edges of all the feathers varied with triangular-shaped spots of gamboge-yellow; the wing-primaries almost black; tail-feathers obliquely barred with shades of grayish-white and brownish-black; the lore, chin, sides of the neck, throat, breast, and all the under surface of the body as far as the vent, jet-black, bounded on the sides with a band of white below the wing; axillary plume elongated, and pure white; under tail-coverts white. The whole length of the bird is about eleven inches.

PLUME-BIRDS. (*See* EPIMACHUS.)

POCHARD, *po'k-ard.*—A handsome British duck, (*Myroca ferina.*) The head and throat are rich chestnut, the back pencilled, and a deep black band encircles the base of the neck. It is an admirable diver.

PODARGUS.—A gen. of GOATSUCKER, *q. v.*

PODICEPS. (*See* GREBE.)

PODOPHTHALMATA. (*See* CRUSTACEA.)

POEPHAGUS. (*See* YAK.)

POGGE. (*See* LYRIE.)

POINTER, *point'-er.*—This member of the canine family is a remarkable instance that the acquired propensities of the different varieties of dog are transmitted from parent to progeny; for, requiring, as it must have done, a long and persevering education to produce even a moderate approach to the excellence of the present breed of pointers, these sagacious dogs will now, almost without education, or, in technical phraseology, with very little breaking, exhibit a strong tendency to the peculiarity of their race, and stand at game of every kind, and that even when they are puppies. The peculiar characteristic of the pointer is, that he will stand motionless, as if converted into a statue, on coming into contact with the slightest scent of game; and it would be difficult to controvert the argument that this instinct, or the power to acquire this habit, was given to the pointer for the purpose of aiding men to capture or kill game. The pointer is probably originally a native of Spain, and the Spanish pointer was formerly well known as a stanch, strong, and useful, but heavy and lazy dog. The English breed, however, is now very much preferred, being exceedingly beautiful, good-tempered, stanch, and patient of fatigue; and at the same time light and active in its appearance and habits. Pointers about the middle of the seventeenth century were scarcely ever to be seen but entirely white, or variegated with liver-coloured spots, except the then Duke of Kingston's celebrated pack, which were black and white; they are now, however, to be met with of every description, from pure white and a kind of bluish-gray, to a universal liver-colour and a perfect black. The most perfect pointers, according to some authorities, are those which have in them, to one part of Spanish blood one-eighth of the foxhound and one-sixteenth of the bloodhound; but other authorities on the subject maintain that the farther any dog is removed from the original Spanish pointer the worse the dog is; that all attempts to cross the pointer with any other blood must necessarily deteriorate the breed; and that whilst a cross will produce handsome dogs, they will necessarily possess some quality not belonging to the pointer; a cross with the hound, for instance, giving the propensity to trace hares, if not to give tongue. Pointers are never considered complete unless they are perfectly stanch to bird, dog, and gun; which implies, first, standing singly to a bird or covey; secondly, to backing (or pointing instantaneously likewise) the moment they perceive another dog stand; and, lastly, not to stir from their point upon the firing of any gun in company, provided the game is neither sprung nor started at which the original point was made.

POKER. (*See* POCHARD.)

POLECATS, *pōle-kăts.*—The polecats belong to a sub-genus of the *Mustelidæ,* or Weasel tribe, a family of digitigrade carnivorous animals; the animals arranged under this sub-genus being the polecat, the ferret, the Siberian polecat, the weasel, and the stoat or ermine-weasel. Another species, remarkable for its amphibious habits, and known under the name of mink, or polecat of the northern seas, is very common in Finland and other parts of the north and east of Europe. The polecat, which is found throughout Europe, is stouter in proportion than either the common weasel or the ermine, and the head broader. Nose rather pointed, ears round and not conspicuous; back comparatively short; tail, including the body, rather more than a third of the length of the body and head. The fur is sometimes fulvous and woolly, and sometimes long, black, and shining, and, although inferior to the fur of the sable or marten, is nevertheless esteemed; a considerable importation of the skins annually coming to this country from the north of Europe under the name of *Fitch.* The length of the head and body is about seventeen inches, and that of the tail about six. It exhales a strong and disagreeable odour. The polecat is most destructive to the poultry-yard and the preserve; its appetite for slaughter seeming never to be satiated as long as any living thing remains within its reach; and its courage being, at the same time, very great. Its nest is generally made in some rabbit-burrow, in the crevice of a rock, or where the tangled herbage and brushwood overgrow loose heaps of stones, and there the female drops from four to six young in May or early in June. *Polecat* has been supposed to be a corruption of *Polish cat;* but this is probably a mere guess.

POLLACK, *pol'-lak.*—A well known fish, found on our own coasts, (*Merlangus pollachius,*) allied to the whiting, the coalfish, and the hake.

POLYCYSTINA, *pol-ly-sis-tie-nah,* a group of Rhizopods, in which the shells are pierced with numerous holes in regular patterns, so that under the microscope they look like vases and baskets made of ivory lace. Through these holes project innumerable tentacles, which can be thrown out to a great comparative distance, and retracted within the shell when they meet with any particle which will serve for food. They are mostly found in the muddy bed of West Indian seas.

POLYNEMUS. (*See* MANGO FISH.)

POLYPE, POLYPI, *pol'-eep, pol-e-pi,* (Gr., *polupous,* having many feet,) the thirteenth class of the invertebrate animals, and one of the largest and most remarkable in the animal kingdom. In this class are comprehended gelatinous animals, with elongated contractile bodies, and an alimentary sac with only one opening. They have distinct terminal mouths, surrounded with tentacula or radiated lobes. The greater part of these beings adhere together and form compound animals. They are all of the simplest kind, and possess so low an organisation that they appear nearly incapable of reproducing their species. Without heads and without eyes, they have neither organs suited for circulation, respiration, nor locomotion. In appearance their bodies are only a homogenous mass, consisting of a gelatinous and irritable cellular tissue, in which the vital fluids move slowly. In form, the body is generally cylindrical or conical, and of a transparent texture; and there is no opening but the mouth, which is surrounded by tentacula, varying in their number and size. Some very remarkable facts are related concerning these strange animals. It would appear that the principle of life is so universally diffused through their simple structure that portions of them may be cut or broken off; and these portions, if allowed to remain in their native element, will soon become perfect animals, with all their functions fully developed. Sometimes the hydra will split in two of its own accord, and each division becomes an independent animal, growing to the same size as the original hydra. In the lowest race of polypi, the distinctive characters of animal life are so slightly developed that there is great difficulty in distinguishing them from the cryptogamic families of the vegetable kingdom. From the egg of these polypi is formed a bulb, from which a stem, sending out branches, shoots up; there is also a root which only serves as an organ of attachment, and not for nourishment. They supply themselves with food by means of their long tentacula, which are the only members capable of voluntary motion. For a long time they were called *animal plants*. The animal structure of polypi in corals had been observed by Imperati and Gesner in 1699; and in 1727 Peysonnel first discovered the living inhabitants of these stony or horny structures. These discoveries were afterwards confirmed by Trembly, whose treatise on the structure and animal functions of the phytoid *Hydræ* and *Plumatellæ* of fresh water opened a new field of research into the nature and relations of many neglected forms of life. The term *Polypus* had been applied by Aristotle and Pliny to a cephalopod; this name was subsequently borrowed by the systematic naturalists who followed Linnæus, and applied by them to many really animalised masses in the form of plants. The subject was particularly investigated by Reaumur, Jussieu, Donati, Ellis, Pallas, Linnæus, and Cuvier. Linnæus placed all the animals of this class as an order of his class *Vermes*, distinguishing them as *Lithophytæ*. Nearly every kind of polypi is attached by the root of the stem or base to submarine rocks or other extraneous bodies. The reproduction of all the adhesive polypi depends on the formation of gemmules, (Lat. *gemma*, a bud,) or imperfectly formed portions of their soft substance. Each of these gemmules is endowed with active powers of locomotion, apparently for the sole purpose of selecting a place whereon to raise its future residence: the situation once being chosen, it is fixed to that spot during its life. When the gemmules first appear on the surface of the parent animal, they are in the form of small black spots; after a few months, they enlarge, each becoming pyriform, and protruding from the sides of the internal canals of the parent, adhering by their narrow ends. This form particularly applies to the young of sponges. Shortly afterwards they are freed, one after the other, and are born along by the currents of fluid, which issue quickly from the larger openings. Upon microscopic examination, these gemmules are found to be about two-thirds covered with short cilia, which are in rapid and constant motion. When they become adherent, it is by the narrow end, which soon expands and forms a broad base of attachment. In some polypi the cilia are very numerous. Dr Grant has estimated that in a single *Flustra foliacea* there are about four hundred millions of cilia! Lamarck classified these creatures in the following manner:—1. *Polypi natantes;* polypi provided with tentacula united in a common fleshy mass, placed in an axis, free and floating in the water. 2. *Polypi tubiferi;* tentaculated polypi united in a common fleshy body, without any solid axis, and covered with tubiform cylinders. 3. *Polypi vaginanti;* polypi with tentacula always fixed in an inorganic covering, and forming in general compound animals. 4. *Polypi denudati;* tentaculated polypi not forming a common envelope, fixed either constantly or spontaneously. 5. *Polypi ciliati;* polypi without any tentacula, but, instead of them, vibratile ciliæ at or near the mouth. The knowledge of these creatures is, however, in its infancy, and as yet no trustworthy system has been discovered, although the imperfections of the old systems are acknowledged by all naturalists, who only use them as provisional aids to reference.—***Ref.*** Johnston's ***History of the British Zoophytes.***

POLYPLECTRON. (*See* PEACOCK-PHEASANT.)

POLYPRION. (*See* STONE-BASSE.)

POLYZOA, *pol-li-zo'-ah*, a large group of animals that were once thought to be zoophytes, but are now known to belong to the molluscs. The animals are compound, and assume various shapes. Among them are the well-known sea-mat, or lemonweed, so plentiful on our coasts, the alcyonidium, or dead-man's fingers; with many others which have been made familiar to us by the marine aquarium.

POMERANIAN DOG, *po-me-rai'-ne-ăn.*—The characteristics of this dog, which is well known in England, are a pointed nose, erect ears, and a bushy tail curled over the back. Its fur, which is usually long and soft, is white, and brown, or buff. They are commonly used by the Dutch and inland navigators to protect property on board vessels, and they are frequently found as watch-dogs on German farms.

POODLE, *poo'-del*, a well-known variety of the dog, which has thick, curled fur, and is peculiarly docile, being capable of learning many amusing tricks. There is a foolish habit, which is rather fashionable, of shaving the whole of the poodle except a tuft on his tail or his legs, and a few patches of fur, according to caprice.

POOR SOLDIER. (*See* FRIAR-BIRD.)

PORBEAGLE. (*See* SHARK BEAUMARIS.)

PORCUPINE, *por'-ku-pine*, (Fr. *porc-épic.*)—Porcupines are of the family of the *Hystricidæ*, belonging to the order *Rodentia*, which has a very wide geographical range, having representatives in the four quarters of the globe. The common porcupine, sometimes called the Italian or African porcupine, when full grown, is about two feet in length; its general colour being a grizzled dusky black resulting from an intermixture of various shades of white, brown, and black. The upper part of the head and neck is furnished with a long crest of thick bristles, capable of being erected or depressed at pleasure, from which the animal derives its name. The hair on the muzzle and limbs is very short, and almost black on the limbs, whilst that of the neck and under parts is brownish, and of considerable length. On the fore part and sides of the neck there is a whitish band; all the remaining parts of the back and sides, including the rump and upper parts of the hinder legs, are armed with spines, which are longest on the centre of the back, being there about nine inches in length, very sharp at the ends, and varied with white and black. These spines are about the thickness of a goose-quill in the middle, and their usual position is lying nearly flat upon the body, with their points directed backwards; but when the animal is excited, they are raised, by means of the subcutaneous muscles, almost at right angles with the body, and then present a very formidable appearance; the story of these animals being able to dart their quills is, however, fabulous. It digs large burrows, divided into many compartments, and brings forth from two to four young. It is a nocturnal animal; sleeping in its burrow during the day, and going forth at nightfall to seek its food, which usually consists of roots, fruits, and tender leaves. It is found wild in Italy and Spain, and is bought in the markets of Rome for the table. Porcupines are found in India, the sand-hills to the south-west of the Caspian

Sea, Southern Tartary, Persia, and Palestine, all parts of Africa, in Mexico and Brazil, and in many parts of North America. There is the tufted-tailed porcupine, (*Atherura Africana,*) which has a long tail decorated at the end with a tuft of flattened quills. The Urson, Cawquaw, or Canadian porcupine, (*Erethizon dorsatum,*) which has short spines, and is mostly found upon trees. The Coendoo or Brazilian porcupine, (*Cercolabes prehensilis,*) which is valuable for its prehensile tail and its powers of climbing.

PORPOISE, or PORPESSE, *por'-pus,* (Ital. *porco pesce,*) the most common of all the *cetacea* on the British coasts. The porpoises swim in shoals, and drive the herrings, mackerel, and salmon before them, pursuing them up the bays with the same eagerness as a dog does a hare. In some places they almost darken the sea as they rise above the water to take breath; they not only seek for prey near the surface, but often descend to the bottom in search of sand-eels and sea-worms, which they root out of the sand with their noses. They go up rivers in pursuit of salmon and other fish, and have been seen at a considerable distance inland. In fine weather they leap, roll, and tumble, and appear heedless and blind to all danger. The oil procured from the fat surrounding the body of the porpoise is of the purest kind, and the skin, when carefully tanned and dressed, is used for wearing-apparel and for coverings of carriages. As an article of food, its flesh was anciently esteemed, and in Henry VIII.'s time was even a royal dish, appearing to have been generally presented as a roast, with a sauce made of fine white bread-crumbs, mixed with vinegar and sugar. At a later period the porpoise kept its ground on the tables of Roman Catholics on fish days and during Lent. Its length is from five to eight feet.

PORTUGUESE MAN-OF-WAR, *por-tew-ge'ez,* (*Physalis pelægicus.*)—A beautiful creature, belonging to the Acalephæ, and allied to the jelly fishes. It has a bubble-like float, coloured with blue, and assuming a soft iridescence at every change of light. From this float depend a number of tentacles, which hang into the water, and possess a power of stinging so great as to numb the arm which touches them, and often to lay up its owner for a day or two. The Portuguese Man-of-War inhabits the warmer seas, and is sometimes blown over to our shores.

PORTUNUS. (*See* FIDDLER CRAB.)

POTATO-FLY, (*Cantharis vittata,* or striped cantharis,) a kind of cantharis found in North America. It is of a dull tawny yellow, or light yellowish-red colour above, with two black spots on the head, and two black stripes on the thorax and on each side of the wing-covers. The under side of the body, together with the legs and antennæ, are black, and covered with a grayish down. Its length is somewhat more than half an inch. Great depredations are committed by this insect in potato-fields and gardens, where it not only eats up the leaves of the potato, but also those of many other vegetables.

POTOROO. (*See* KANGAROO CAT.)

POTTO. (*See* KINKAJOU.)

POULTRY, *pole'-tre,* (from Fr. *poule,* a hen,) a general term, which includes every kind of domestic fowl that is reared about the house or farm-yard—as cocks and hens, ducks, geese, turkeys, &c. Although poultry constitutes part of the stock of every farmer in this country, the rearing of it is not often productive of any pecuniary advantage. Notwithstanding the fact that fowls are looked upon chiefly as articles of luxury, and sell at high prices in the market, they seldom or ever repay the value of the corn which they have consumed, especially if such grain has to be purchased. There are many different breeds of fowls. Those best known are the *game* breed, the *white* or *English* breed, the *black* or *Polish* breed, the *Dorking* breed, the large or *shakebag* breed, the *Malay* and the *Cochin-China* breeds. The two first are much smaller breeds than the others. This kind of stock affords profit in the eggs as well as the chickens; therefore such as are the best layers and sitters should be chosen, which are in general the game and Polish breeds. The game and white breeds are considered the most delicate as food.

PRAIRIE-DOG, a small rodent animal, the *Spermophilus ludovicianus,* allied to the marmot, and found on the prairies west of the Mississippi. It is about sixteen inches in length, the tail being about two inches and three-quarters. The colour of the upper parts of the body is a light, dirty reddish-brown, mingled with gray, and with a few black hairs above, the under parts being a dirty white; the whiskers moderately long and black. It has been named *Prairie-dog* by the Anglo-Americans, from the supposed resemblance of its warning cry to that of a small dog; but the resemblance is by no means close. They live in burrows, many of which are congregated together in one district, and which sometimes cover an area of many miles. These burrows are sometimes level, or nearly so, with the ground; but more commonly form little mounds in the form of truncated cones, about a foot or a foot and a half in height, with a base of two or three feet, and about twenty feet apart. The whole external surface is well-trodden and very compact, and the entrance is either at the top or at one side; whence the hole descends vertically for a foot or two, and then runs obliquely downwards. Within this hole, which sometimes contains as many as seven or eight tenants, they form a globular cell of fine dry grass, in which they remain asleep during the winter, having carefully closed up the entrance, in order to resist the severity of the cold. In fine weather, they delight to play about the entrances to their burrows, into which they instantly drop on the appearance of any immediate danger; but if it be not too imminent, they remain at the edge, sitting erect, or flourishing their tails and barking, whilst on the look-out. The animal is known to the Indians by the name of the *Wish-ton-Wish.*

PRATINCOLÆ, *pray'-tin-cole.*—A popular name given to certain birds belonging to the Chats, such as the whinchat and stonechat.

PRAWN, *prawn,* is the name of a crustaceous animal, belonging to the genus *Palæmon.* The common prawn (*Palæmon serratus*) has the following specific character:—Rostrum extending considerably beyond the antennal scale; turned upwards anteriorly; bifid at the extremity; above, armed with seven or eight teeth, the anterior third unarmed; beneath, with five or six teeth. The eyes are large and round; and the external antennæ very long, being half as long again as the animal, from the tail to the extremity of the rostrum. The ordinary length is between three and four inches; the colour bright gray, spotted, and lined with darker purplish-gray. It is well known as a favourite article of food, and is found in vast numbers on all the coasts of Great Britain. In the adult condition they frequent rocky parts of the coast, delighting in still transparent water, where they disport amongst the long fuci which wave in the tide. They are sometimes taken in bag-nets, suspended from a circular ring of iron at the end of a pole; but in many parts the finest are caught in pots, resembling lobster-pots, but smaller, and made of a closer fabric. They are chiefly obtained for the London market off the Isle of Wight and the coast of Hampshire. There are many species of prawn, some of which, such as the æsop-prawn, are well known as beautiful inhabitants of the aquarium.

Praying Insect. (*See* Mantis.)

Pristis. (*See* Sawfish.)

Proboscis, *pro-bos'-is*, (Gr. *pro*, before; *bosko*, I feed,) the term applied in Nat. Hist. to the snout or trunk of an elephant and other analogous animals, and particularly of insects. An elephant's proboscis is a flexible muscular pipe or canal, of about eight feet in length, and, correctly speaking, is an extension of the nose. It is with this instrument that he takes his food, and carries it to his mouth. The proboscis of an insect is either used for sucking blood from animals or juices from plants. In conchology, the term proboscis is applied to the tongue of certain gastropods, such as shell-snails, when it is so long as to be capable of being protruded for some distance from the mouth. In such cases the proboscis is used for boring the shells of other testaceæ, and of destroying by suction the soft parts of the animal.

Procyon. (*See* Racoon.)

Prosopis, *pro-so'-pis*, (Gr. *prosopon*, a mask,) in Bot., a gen. of the nat. ord. *Leguminosæ*, sub-ord. *Mimoseæ*. The legumes of *P. pallida*, and some other South American species, are remarkable for their astringency, and have been successfully employed for tanning. In commerce they are known under the names of *algaroba* and *algarobilla*. From the fruit of *P. algaroba* a drink called *chica* is prepared. The name *chica* was first given to a fermented drink prepared from the maize; but it is now used in South America as a common term for several intoxicating liquors.

Proteles. (*See* Aard Vark.)

Proteus, *pro'-te-us*, (after Proteus, the ever-changing sea-god,) one of the genera of those *Batrachides* which preserve their branchiæ throughout life, and which are the sole vertebrated animals that are truly amphibious. The proteus has four feet; there are three toes on the anterior feet, and two only on the posterior feet. The skeleton bears considerable resemblance to that of the salamander; but the proteus has many more vertebræ than the salamander, and less of the rudiments of ribs; and its bony head is entirely different from theirs in its general conformation. But one species appears to be known,—the *Proteus anguinus*, which is described by Cuvier as more than a foot long, of the size of a human finger, with a tail vertically compressed, and four little legs; the muzzle elongated and depressed; both of its jaws furnished with teeth; tongue with but little motion, but free in front; eyes excessively small and hidden by the skin, as in the rat-mole; the ears covered by the flesh, as in the salamander; its skin smooth and whitish. At first view, the animal might be supposed to be a lizard; but it has the motions of a fish. Its head and the lower part of its body and tail bear a strong resemblance to those of the eel; but it has no fins, and its branchial organs form a curious vascular structure, almost like a crest round the throat, which, as the animal is likewise furnished with lungs, may be removed without occasioning its death. Its fore-feet resemble hands, but they have only three claws or fingers, and are too feeble to be of use in grasping or supporting the weight of the animal; the hinder-feet have only two claws or toes, and in the larger specimens are found so imperfect as to be almost obliterated. It has small points in place of eyes, as if to preserve the analogy of nature; its two nasal organs, however, are large, and as it is abundantly furnished with teeth, it may be concluded that it is an animal of prey, although, in their confined state, they have never been known to eat, and have been kept alive for many years by merely changing the water in which they have been placed. They were first discovered by Baron Zöig in subterranean pools in Illyria.

Protonopsis, *pro-to-no'p-sis.*—A genus of salamander, found in the Ohio and Alleghany rivers, and much dreaded on account of its voracity. It is about two feet long, and its colour is gray, diversified with black spots. It is also called the Tweeg, Ground-puppy, &c. (*See* Menopome.)

Pseudopis, *seu'-dŏ-pis.*—A genus of footless lizards, found in Northern Africa, and allied to our blindworm. (*See* Sheltopusik.)

Psittacus. (*See* Parrot.)

Psoas Muscle, *so'-ăs*, (Gr. *psoa*, the loins,) a large muscle upon the fore part and sides of the lumbar vertebræ. It bends the thigh forwards, and assists in turning it outwards.

Ptarmigan, *tar'-mi-găn*, (Gaelic *tarmachan*.) —The ptarmigan is the smallest in size of the British grouse, and, as a British bird, is now only found on the summits of some of our highest hills, chiefly in the central and northern parts of Scotland, in the Hebrides and Orkneys, and now and then on the lofty hills of Cumberland and Wales. It pairs early in spring, and lays eight or ten eggs, frequently on the bare ground, among stones, of a yellowish-white colour, sparingly spotted with light brown, and in length one inch eight lines by one inch two lines in breadth. Its food consists of the various sorts of Alpine berries, seeds, and the tender shoots of Alpine plants, and its note or call is not unlike that of the missel thrush, but rather more harsh in sound. It is found on most of the elevated mountain-ranges of the continent of Europe, even to Italy, as well as in Greenland and the northern part of North America, but is nowhere more plentiful than over all the more northern parts of Scandinavia, where it sometimes perches in such numbers in the birch-trees that the latter seem to be altogether clothed in white. In comparatively temperate climates, such as that of Scotland, these birds seem to prefer the bare and stony sides or summits of the highest mountains; but in more rigorous climates, such as that of Greenland, they are chiefly found in the vicinity of the sea-shore, by the banks of rivers, and among the willow and other copse-woods of the lower and more sheltered vales. A remarkable peculiarity of the ptarmigan is the difference between the colour of its plumage in winter and that which it bears in summer. In the latter season, its predominant colours are speckled black, brown, or gray,—the male being of a much darker colour than the female; but in winter, the plumage of the male is almost all pure white, and that of the female quite so. The male is about fifteen inches in length, and the female about an inch less. The ptarmigan has been reared in confinement without difficulty, and has been known to breed in a tame state. (*See* GROUSE.)

PTERACLIS, *ter'-ra-klis*, a remarkable fish, allied to the coryphene. Both the dorsal and the anal fins are remarkably large, so that the depth from tip to tip of their fins is almost one-fourth more than the length of the entire fish, including the tail. It is only found in the hot seas.

PTERODACTYL, *ter-o-dăk-til*, (Gr. *pteron*, a wing; *daktulos*, a digit,) the name of a genus of extinct flying reptiles. From the fossil remains of this animal, it would appear that the second digit of the hand was of great length; and it is believed that this prolonged digit supported a wing-formed expansion of the skin. In speaking of the fossils of the Solenhofen district, where the remains of pterodactyls are found, Cuvier observes that there formerly lived in that canton crocodiles, *Limuli*, and other animals, whose geographical distribution is now confined to the torrid zone. Together with them were these flying saurians, which flitted about by means of the membrane, sustained by a single finger; suspended themselves, and perhaps crept by the aid of the other three fingers; stood upon their hind legs only; and had their enormous crocodile-shaped mouth armed with small pointed teeth, fit only for seizing insects and small animals.

PTEROMYS. (*See* FLYING SQUIRREL.)

PTEROPUS. (*See* FLYING FOX.)

PTILINUS. (*See* BOOKWORM.)

PTILONORHYNCHUS. (*See* BOWER-BIRD.)

PUDDING-STONE. (*See* CONGLOMERATE.)

PUFF-ADDER, *puf-ad-der*, one of the most deadly snakes in the world, found in Southern Africa, (*Clotho arietans.*) It has a habit of grovelling in the sand, so that travellers are liable to tread on it; and but for the sluggishness of its nature, many of the bare-limbed natives would be destroyed by it every year. The Bushmen know its nature, and will fearlessly set their bare foot upon its neck, so as to prevent it from striking, and then cut off its head while it is thus prisoned. They extract the poison-gland, which is much used in arming their small, but deadly arrows. Other members of the same species are the Das Adder, or River Jack, (*C. nasicornis*,) the Berg Adder, (*C. atropos*,) and the Horned Adder, Hornsman, or Plumed Viper, (*C. cornuta.*) This last-mentioned species is remarkable for the small thread-like projections that rise like little horns from above the eyes.

PUFFIN, *puf'-fin*, (*Fratercula arctica.*)—The generic character of this singular bird, sometimes called the sea-parrot and coulterneb, are:—Bill shorter than the head, higher than long, very much compressed; both mandibles arched, transversely grooved, notched towards the point; the culmen as high as the top of the head, and with a cutting edge. Nostrils lateral, marginal, linear, naked, almost entirely closed by a naked membrane. Legs short, abdominal. Feet with three toes only, all in front, united by membranes; claws curved. Wings and tail short. Its size is about that of a pigeon or jackdaw, with the upper parts dusky, the lower white, a broad black band round the neck; the bill red, with three grooves across each mandible. It abounds on the northern coasts of Europe and America, where it breeds in burrows formed by itself in the soil of unfrequented islands, making no proper nest. It is only a summer visitor to the British Islands, making its appearance early in April, and departing by the end of August. It visits the Isle of Man, the coast of Anglesey, the high cliffs of the Isle of Wight, between the Needle Rocks and Freshwater Gate, the Yorkshire coast, the Fern Islands, many of the Scottish islands, and the Scilly Islands, which, in the 14th century, were held under the king as Earl of Cornwall, by Ranulph de Blancminster, for an annual payment of six and eightpence, or three hundred puffins at Christmas. Early in May, these birds deposit a single large egg, sometimes in fissures and crevices on the perpendicular surface of the cliffs, at the depth of three or four feet from the front, and sometimes in burrows, for the possession of which they have previously contended with their proper owners, the rabbits. It is two inches three lines in length, by one inch and seven lines in breadth, and when first laid is white, sometimes spotted with pale cinareous, but soon becomes soiled and dirty from its contact with the earth. The young are hatched after a month's incubation, and at the end of a month or five weeks, the long blackish down with which they are at first covered having given place to the feathered plumage, they are able to follow their parents to the open sea. Soon after this, or about the second week in August, the whole leave our coasts. Puffins walk with a waddling gait, but fly rapidly for a moderate distance, and can swim and dive well. They feed on marine insects, small crustacea, and young fish. An example of the species wanders occasionally, as if by accident, to Sicily and Malta.

PUMA, *pu'-mă*, (*Felis concolor*, Lin.)—This animal, known also as the American lion, and popularly called the panther, or painter, is found not only over a great portion of South America, but extends northwards to the province of Pennsylvania, even making occasional inroads into the state of New York. It is equal to its prototype neither in size, fierceness, nor colour; differing from it especially in the smallness of the head, the want of mane and tufted tail. It measures about five feet in length, and its tail is long and trailing; its limbs are strong but short, and therefore it stands low. The upper part of the neck and body, and the outside of the legs, are of a deep yellow, tinged with black on the upper parts, by the tipping of the hairs being black; the forehead and upper parts of the head dingy yellow, mingled with gray and black; the under part of the throat, chest, and inside of forelegs, yellowish white; belly white, tinged with yellow; inside of the thighs white, shaded with red and ash; tail yellow, with a black tip and some black hairs on the upper part. Whiskers long, part black and part white; the part of the upper lip on which they are placed, black; the remainder of it, the lower lip, and the throat, beautifully white. The younger animal is marked with indistinct spots, of a deeper tint than the general colour; but these disappear as the animal increases in age. It rather inhabits plains than forests, and approaches near to the habitations of man. It is a cowardly animal, flying at the sight of a human being, and in the north, where it is more timid than in the south, even from the attacks of a dog; but it is at the same time almost the only animal against which the charge of wanton or unnecessary cruelty can be fairly maintained; habitually killing more animals than it can devour, for the sake of sipping a little of the blood of each. It ascends trees, and its usual method of taking its prey is by lurking in one, and dropping from it as the unsuspicious animal passes by. When taken young, it may be tamed and domesticated like a cat. The Indians employ its coat, which is soft, for clothing, and from it also are made boots and shoes.

Pupa. (*See* Insect-Transformations.)

Pupil. (*See* Eye.)

Purre. (*See* Dunlin.)

Puss-moth, *poos-moth,* (*Cerura vinula,*) a handsome, large-bodied British moth, which is best known by its beautiful cocoon. The mouth of this habitation is guarded by stiff hairs, which converge to a point, so as to allow the enclosed moth to escape, but to prevent any other creature from gaining admission.

Putorius. (*See* Pole-cat.)

Pyrosoma, *pie-ro-soh'-mah,* a gen. of compound ascidians, in which the animals are arranged in the form of a hollow cylinder. At night, the whole mass glows with brilliant light, as if it were white hot; and when many specimens are congregated together, their radiance is so powerful that a book can be read at midnight by its aid.

Python.—Generic name for some of the gigantic boas of Africa. (*See* Boa.)

Q.

Quadrumana, *kwod-ru'-mă-nă,* (Lat., *quadra, quatuor,* four; *manus,* a hand,) the name of an order of mammalia, comprehending those in which the four extremities are each terminated by a hand; as the ape, baboon, &c. The term four-handed does not, however, apply correctly to all the animals thus called. In the monkeys of the western hemisphere, the thumb in the hands or front extremities is wholly, or in part, wanting. Amongst all the species of the quadrumana, there are strongly-marked differences as to the degree in which they resemble man in their general conformation. In some, there is a strong resemblance to him, both in structure, aspect, and gait; whilst others are very slightly removed from the ordinary mammalia. There is, moreover, great variety in their food and habits of life. The larger proportion are gregarious, but some live solitary and others in pairs. Some species dwell on the ground, others inhabit rocky heights, while others live altogether among the branches of trees. With regard to the order of quadrumana, Cuvier remarks, that, independently of the anatomical details which distinguish them from man, they differ from him in the very striking character arising from their hind-feet having free thumbs, which are opposable to the other fingers, whilst those fingers are long and flexible like those of the hand. Consequently, they climb trees with facility; but they do not hold themselves or walk erect except with difficulty; their foot in such cases not resting on the sole, but on its external edge, and their narrow pelvis not favouring equilibrium in that quarter. The whole of the quadrumana are divided into three families or tribes, namely,—1. *Simiadæ,* or monkeys of the Old World; 2. *Cebidæ,* or monkeys of the New World; 3. *Lemuridæ,* or the Lemur tribe. They may be known by the following characteristics:—The Simiadæ have five molars in each jaw, the nails are never pointed or claw-like, and the tail, when present, is not prehensile. The nostrils are separated by a narrow septum. The Cebidæ have small molars, their tail is long and mostly prehensile, and their nostrils are separated by a very wide septum. The Lemuridæ have four incisive teeth in the upper jaw, separated by a small space from the carnives. The nail of the second finger is pointed and claw-like, and all the others are flat. These creatures inhabit Madagascar, Borneo, Sumatra, &c. (*See* Ape, Baboon, Chimpanzee, Gorilla, Ourang-Outang, &c.)

Quadrupeds, *kwod'-ru-peds,* (Lat., *quatuor, quadra,* four; *pes,* a foot,) a name formerly given in Nat. Hist. to all vertebrate land animals having four extremities fitted for progressive motion on the earth. The scaly reptiles were called oviparous quadrupeds, to distinguish them from the hairy, warm-blooded, viviparous four-footed mammals. As, however, animals of both these classes, although agreeing in having four legs, differ essentially in many other respects, the term quadruped is no longer scientifically employed to distinguish any particular group of animals.

Quagga, *kwăg'-gă,* (*Asinus Quagga.*)—This animal, which is an inhabitant of the southern parts of Africa, and bears a great resemblance to the zebra, belongs to one of the six distinct, though nearly allied, species which constitute the genus *Solidungula,* or Horse tribe. It is less than the zebra, with the hinder parts higher and the ears shorter. It measures about four feet in height at the withers. The head, neck, mane, and shoulders are deep blackish-brown, striped with grayish-white lines; the other parts being of a clearer brown, paler beneath, and almost white upon the belly. A black line runs along the spine to the tail. It is a social animal, living in large troops on the karoos or flats of Southern Africa, and frequently pastures in company with the zebra; but no third or intermediate variety has sprung up between them. It is much more docile than the zebra, and is said to be sometimes used at the Cape of Good Hope as a beast of draught or burden. On its native plains, however, it is exceedingly fearless, contending with beasts of prey with much courage and frequent success. Its name *Quagga* is said to be derived from its voice, which resembles the barking of a dog.

Quail, *kwaile,* (Ital., *quaglia.*)—The characteristics of the common quail (*Coturnix vulgaris*) are:—Beak strong, shorter than the head; upper mandible curved. Nostrils basal, lateral, half closed by an arched membrane. Feet with four toes; those anterior connected by a membrane as far as the first articulation. Tail short, rounded, recumbent, almost hid by the tail-coverts. This bird has generally been considered as a summer visitant to England; but recent observations have led to the opinion, that although it is to a certain extent a migratory bird, many of the species remain in England and Ireland throughout the year. Quails arrive from Africa in large numbers on the islands of the Mediterranean and the Grecian archipelago about April, and thence spread over Southern Europe, migrating as far north as Scandinavia and Russia. They arrive in Great Britain in May, and seem more partial to the open country than to that which is enclosed. No individual of the gallinaceous order is so widely distributed over the Old World as the common quail: it is abundant in North Africa, most parts of India, and, there is reason to believe, China; while the whole of the southern portions of Siberia, and every country in Europe, except those approximating to the polar circle, are visited by it annually, or adopted for a permanent abode. In England, however, this bird is not very abundant, and the supply for the London market comes principally from France. The males arrive in England and France before the females, and, betraying themselves by their thrice-repeated whistle, are frequently lured within reach of the fowler by the imitation of the female's note on a quill pipe. The flesh of the quail is delicate, and very little inferior to that of the landrail, and consequently it is in great request, as many as three thousand dozen having been sold in London in a single season. Though very like a partridge, and resembling those birds also in several of their habits, quails do not pair, the males being polygamous. For a nest, the female scrapes out a small cavity on the ground, usually amongst wheat, but sometimes in a piece of clover or grass, into which she collects a few bits of dry grass, straw, or clover-stalks. The eggs are of a yellowish or dull orange-coloured white, speckled or blotched with umber-brown, from six to twelve or fourteen in number, and one inch one line in length, by eleven lines in breadth. Upon these the female sits about three weeks; the young are able to follow her soon after they are excluded from the shell, and learn to feed on seeds, grain, insects, and green leaves. The quail is about seven inches in length, and the general colour of the upper part of the plumage is dark brown, mottled and streaked with lighter brown, which is also the colour of the upper part of the breast, whilst the lower part of the breast, the belly, and the under tail-coverts are yellowish white. This bird is historically interesting, from the circumstance that there is the strongest ground for believing that it is the identical species which supplied the Israelites with food in the wilderness. There are several other species of quail; such as the rock quail, of Deccan, used for quail-fights by the natives; and the Virginian or Maryland quail, which is a general inhabitant of North America, from the northern parts of Canada and Nova Scotia to the extremity of the peninsula of Florida, the flesh of which is peculiarly white, tender, and delicate.

QUASJE, or QUASCHI, *quas'-jee*, a species of Coaiti found in South America, (*Nasua narica*,) sometimes called the Brown Coaiti. It can be tamed easily, and is useful in ridding the house of mice, rats, and the garden of slugs, snails, and different insects. Its colour is very variable, but brown is the leading hue, and the tail is thickly furred, and mostly banded with black.

QUATA. (*See* COAITA.)

QUERQUEDULA. (*See* TEAL.)

QUISCALUS, *kwis-kă-lus*. (*See* BOAT-TAIL.)

R

RABBIT, *răb'-bit*, (said to come from the Belgic *robbe*, *robbeken*, (*Lepus cuniculus*.)—This animal, now so common throughout the southern and temperate parts of Europe, is supposed to have been of African origin, and first imported into Spain. It belongs to the same genus as the hare, and resembles it in form, but differs from it considerably in its gregarious habits, its subterranean life, its whiter flesh, and less perfect state of the young when produced, these being blind at their birth, and nearly naked. It is very prolific, breeding seven times a year, and bringing five young ones each time. The rabbit affects a temperate and warm climate, and bears great cold with difficulty. In Sweden, they are obliged to be kept in houses. In England, they are most plentiful in the counties of Lincoln, Norfolk, Suffolk, and Cambridge, where the soil is sandy, and whence they are brought in immense numbers for the supply of the London market. Rabbits have been known from the earliest periods of history, and the first or earliest accounts which we have of them represent them as inhabiting the warm and sandy places of southern climates, especially those near the shores of the sea. It has been introduced in recent times into America, and having found in the more southerly portions of that country a climate very congenial to its constitution, has increased rapidly. The rabbit in a natural state has the ears shorter than the head, and the tail is not so long as the thigh. The general colour in a state of nature is yellowish-gray, with reddish on the neck and brown on the tail, with the throat and belly whitish. The ears are gray. There are four varieties of rabbits, differing somewhat in their characteristics and habits, namely, the *warreners*, *parkers*, *hedgehogs*, and *sweethearts*. The first kind, as their name implies, are in the habit of making their homes or burrows in open grounds or warrens; the *hedgehogs* are found in thick hedgerows and wood covers in parts where the soil is not sufficiently sandy to be made a subterranean dwelling, and the coat of them is less furry than that of the others; the *parkers* live on the upland also, as in gentlemen's parks, pleasure-grounds, and broad open grazing grounds, and breed in any convenient spot, and, except to the eye of a professional warrener, are undistinguishable from the last variety. *Sweethearts* are the tame varieties, and now multiplied into innumerable varieties of size, colour, and character, from the olden to the lop-eared, and from the middle-sized to the monster of ten pounds weight. When only five or six months old, rabbits are capable of breeding, their term of gestation being thirty or thirty-one days. If the dam does not find a hole suited to her purpose previously to her bringing forth, she digs one, not in a straight line, but in a zig-zag direction, enlarging the bottom of it every way, and pulling from her own body a quantity of hair, with which she makes a warm and comfortable bed for her young. When she ventures abroad, she covers up the hole very carefully, scarcely leaving any perceptible mark of it, and conceals her charge from the male, it is said, lest he should devour them. She continues these attentions for about a month, when the young are able to provide for themselves. The ordinary term of a rabbit's existence is from seven to ten years. As rabbits cannot articulate sounds, and are formed into societies living under ground, their method of giving an alarm is very peculiar; for when any danger threatens, they thump the earth with one of their hinder feet, and produce a sound which can be heard by animals near the surface at a considerable distance. They are very sensible to any changes of the weather, and seldom go abroad unless it be settled and calm.

Rabbit Fish. (*See* Chimæra.)

Rabbit, Rock. (*See* Hyrax.)

Races, *rai'ces*, (Fr.,) in Bot., those permanent varieties of species which can be propagated by seed. Familiar examples are afforded by our cereal grains, (wheat, oats, barley, &c.,) and by our culinary vegetables, (peas, lettuces, radishes, cabbages, cauliflowers, &c.) Such permanent varieties, however, require to be kept up by cultivation, for if left to themselves, or sown in a poor soil, they will soon lose their peculiarities, and either perish or return to their original specific type.

Racoon, *răk-koon'*, (*Procyon Lotor*.)—This animal is a fox-like creature with the gait of a bear. The head is round, with a narrow tapering nose, projecting beyond the mouth, black at the end, and flexible; the lips black. Eyes moderately large and round, with a circular pupil. Elliptical ears, low but erect, with rounded tips, dirty white. Whiskers strong. Short-haired muzzle, dirty white, the colour extending round the cheek and over the eyes. Back grizzled. Belly paler than the back. Tail bushy; not unlike a fox's brush, dirty white, annulated with dark rings. Length of head and body, two feet; of tail, (*vertebræ*,) nine and a half inches. It is a native of the north of America, and, according to some authorities, extends as far south as Paraguay. In a state of nature, it sleeps throughout the day, prowling during the night in search of fruits, roots, birds' eggs, and insects. At low water, it frequents the sea-shore, where it preys on crustacea and shell-fish. It climbs trees with great facility. Its sagacity is considerable; but as it is not very powerfully armed, it is not very courageous, and seldom approaches dwellings with the same hardiness as animals decidedly carnivorous. Another species, the crab racoon, (*Procyon cancrivorus*), is an inhabitant of the warmer parts of South America, and is rather a larger animal than the common racoon; but the characteristics of each are very similar. It is called Lotor, or washer, because it has an odd habit of washing its food before eating. Any one who visits the Zoological Gardens, and will give a racoon a piece of bread, may see it take the bread in both fore-paws, put it into the water-pan, and shake it about violently for a few seconds.

Racoonda. (*See* Coypu Rat.)

Radiata, *ray-dy'-ai'-ta*, a vast group of animals without limbs or joints, and which radiate from a common centre. All the star-fishes, sea-urchins, sea-anemones, and similar beings, belong to this group.

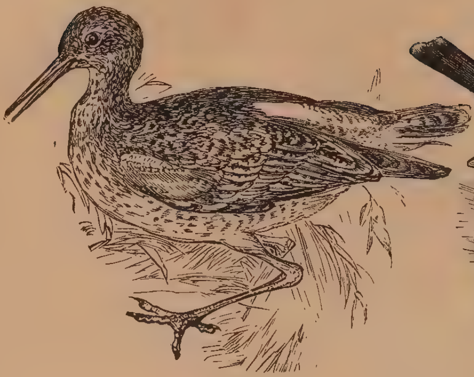
Rails, *rales*, a family of birds (Rallidæ) belonging to the order Grallæ, which have the bill long, curved at the tip, and flattened at the sides. The legs are slender and rather long, and the tail rounded. The water-rail and the corncrake are two good examples of this family. The water-rail (*Rallus aquaticus*) is common in many parts of England, but, as it is very shy, is not often seen. It is to be seen about rivers, ponds, and lakes; and is very ingenious in hiding itself whenever it fears danger, diving below the surface, and directing its subaquatic course towards the thick reeds. When once the water-rail has gained this shelter, it is mostly safe, for it glides through the reeds with such ready swiftness that scarcely any dog can overtake it. If the bird be seen on land, it may be easily recognised by the white feathers under the tail, which is continually jerked up and down as the bird runs along. Its colour is brown above, mottled with black, and grey below, barred with black on the flanks. In length the bird measures about twelve inches.

Rain-bird, *rane bird*, one of the Ground Cuckoos, which inhabits Jamaica and the West Indies, and is sometimes called Tom Fool, because it is so inquisitive that at the sight of any novelty, it will sit still for the purpose of gratifying its curiosity, and allow itself to be struck from its perch. It is not a very handsome species, but the bold bars of black and white upon the tail redeem it from insignificance.

Rallus. (*See* Rails.)

Rana. (*See* Frog.)

Rat, *răt*, (Sax. *ræt;* gen. *mus*,) a gen. of rodent mammalia, numerous in species, and beyond all possibility of numbering them. Taken to the full extent which is included by Cuvier, the rat family comprehends not fewer than fourteen or fifteen genera, which have all some resemblance to each other, but most of them differing so much from the true rat in their dispositions and manners, that the same general description cannot be made to apply to them all. The true rats belong to a vegetable-eating family, and yet are all more or less fond of animal substances, and some of them attack living animals, without much regard to size; but when they do so, it is still in accordance with the general gnawing character of the Rodentia. They do not kill, but begin to eat the living body; and there are instances of rats having in this way inflicted terrible lacerations upon infants and persons otherwise helpless. At the same time, there is little doubt that rats destroy a vast number of offensive substances, and it is tolerably certain that in cities, where is an under-drainage by sewers, the brown rats, which make the sewers their principal haunts, contribute not a little both to cleanliness and health. The general characters which distinguish the genus from the other Rodentia may be stated thus:—The teeth consist of two incisors, two canines, and three cheek-teeth in each side of each jaw. The crowns of the cheek-teeth are tuberculated, and thus bruising teeth rather than grinding ones, and the incisors are firm, strong, hard in their enamel, sharp in their edges, and well adapted for gnawing. The ears of the genus are generally long, of an ovate or rounded form, and well developed, and it is understood that the sense of hearing in all is very acute. The ears are nearly naked, as are also the feet, which are plantigrade. The fore-feet have only four toes fully developed, the one answering to the thumb being merely a rudimental tubercle, though it is furnished with a little flat nail; the nails on the other four toes are well adapted for digging. The hind feet have all the five toes fully developed. The tail varies in length, but is generally long, naked, except a few short hairs, and is covered between them with a sort of scales, which are not true scales, however, but merely little hardened plates of the epidermis, which easily fall off, and are replaced by others. The principal fur is very soft; but it is generally interspersed with longer and thicker hairs, which project beyond the soft fur, and are shining in their lustre. Many of them take the water readily, and preserve their fur dry; but there are some which are easily wetted. They are all very fond of drinking, which operation they perform by lapping with the tongue. In all the species the tendency to production is very great; and where they have food and shelter, and moderate warmth, it is not confined to any one season. The number of young in a litter is often considerable, exceeding that of the teats of the female, and in some cases double the number of these. The teats are six in number, and the young are often twelve. There are two species of rat in this country,—the brown rat and the black rat. The brown rat (*M. Decumanus*) is but a recent importation into this country, or even into Europe, or the north of Asia, and nothing certain is known of its origin. It is asserted by some good authorities, however, that it is an Eastern animal, and that it first made its appearance in the western countries of Europe only during the earlier half of last century. They are properly ground animals, and in those places where the two species of this country are found together, they are called ground rats or flax rats, in distinction from the black ones, which are roof rats. The brown rat makes burrows with great vigour and expedition, if it cannot find any ready made, and loves to burrow under the foundations of walls and houses. It is partial to drains of foul water, swims with great facility, abounds in seaport towns, and frequently establishes itself on board of ship. They often undermine the foundations of granaries and storehouses, of manufactories which abound in offal, and of mills; and, in the last case, they sometimes mine through the dams of the ponds, and let out the water. In poultry-yards and preserved grounds they commit considerable depredations on the eggs and the young birds, and carry off considerable quantities of grain from ricks and barns. The brown rat is the largest of the genus to be met with in Britain, being ten inches long in the head and body, of which the head occupies two and a half. The ears are about two-thirds of an inch long, which is less than the length of those of the black rat. The tail is also shorter in proportion, and both they and the muzzle are nearly naked. The upper colour of the fur is greyish-brown, and the under colour whitish-grey. The body is thick and strong, and the expression of the animal is a mixture of cunning and sulkiness. The black rat (*M. Rattus*) is a smaller animal, of a darker colour, a more elongated head, and sharper muzzle than the preceding. It is equally omnivorous, but less productive. It is sometimes called the "old English rat," from the fact of its being known in England long before the appearance there of the brown rat. Its original country is extremely doubtful; ancient authors make no mention of it; and the prevailing belief is, that it made its way into Europe during the Middle Ages. Although it is still the prevailing species in many parts of Europe, it is now somewhat rare in Great Britain, and a belief has long prevailed that the brown rat has eaten up the black one; but there is no authentic evidence on the subject, and the fact that the localities chosen by the two species are different —the brown rat loving low-lying, cold, and damp places, whilst the black rat is a murine animal, and dwells in holes of walls and crevices of roofs, seems to lead to an opposite conclusion. The black rat is very considerably smaller than the brown one, seldom measuring so much as seven inches and a half in length; and though its muzzle is larger, its head is altogether shorter. Its ears are also larger and rounder, and its tail is longer than its body, while that of the other is not so long; the ears and tail are naked; the eyes rather large; the fur on the body shaggy; the whiskers and tufts of stiff hairs over the eyes very long; and the whole expression more rough and fierce than that of the brown rat. It is also more rapid in its motions and a better climber. The colour is black, with a tinge of grey above and ash-colour on the under part; often whiter on the breast and throat. Foreign countries produce various species of the rat tribe unknown to Europe; as the Malabar rat (*Mus giganteus*), a species of enormous size; its length, including the tail, which is nearly a foot long, being thirty inches. It is found in many places on the Coromandel coast, in Mysore, and several parts of Bengal. The bite of this species is considered dangerous. The *Pilori*, or musk-rat of the Antilles, is another large and destructive rat, measuring fifteen inches, exclusive of the tail. There are also the *Sumatra rat*, the *Caraco rat*, the *Alexandrian rat*, and the *Iceland rat;* the distinguishing characteristics of which are too slight to deserve particular notice. The *Water-rat* is an animal respecting which observers are by no means agreed; for while some say that it is simply the common brown rat, others declare that it is a distinct species. The fact is, that there is a distinct species of amphibious rat, but that the common brown rat often imitates its habits. The water-rat (*Arvicola amphibius*), or water-vole, as it is frequently, and now correctly, called, is intermediate in size between the brown rat and the black one; the head is thick and short, and the muzzle is blunt, not indicating that keenness of scent which is possessed by the land-rat. The ears are less than half an inch in length, and almost entirely hidden in the fur, which is very closely set, and is of that shining character which, in the hairy animals, has a strong repulsion to water, so that it does not get matted, or even wet, when under water. The colour of the upper part is mixed brown, showing both a greyish and a reddish tinge; and



REDSHANK.

RED WING.

REINDEERS.

the under part is grey, having in some individuals a yellowish tinge. The tail is not naked, like those of the land rats, but has fine short fur on the upper surface and pretty long hairs on the under. The fore feet have four complete toes, the last phalanx only of the thumb being conspicuous beyond the skin; hinder feet with five toes, not webbed, though connected for a short distance from the base. The water-rat is said to be one of those gentle Rodentia that would not, under any circumstances, hurt anything living. It inhabits the banks of rivers, streams, ponds, and even ditches, in the banks of which it burrows and breeds. The opening to its burrow is never very far above the level of the water, and if that level be subject to variations from floods, there are generally two openings, —one higher and the other lower. As already observed, it is a vegetable feeder, and the fleshy and bulbous roots of plants form the chief part of its food. The water-rat is a very cleanly animal, and generally has but one brood, consisting of five or six: these are generally born in May or June, when the vegetation is well forward; but the young are sometimes produced as early as April; in which latter case there is a second litter towards the end of summer or beginning of autumn. When the animal is alarmed by any one treading on its burrow, or surprised on the grass at the entrance, it takes to the water as a means of safety, and gets down till it is quite submerged; but it has not the same power of continuing below as the otter and other mammalia which prey in the water. It is found in all parts of Britain, and also of continental Europe, where the waters and their banks are suited to its habits, and is always most abundant where the banks are of a rich or loamy character. There are many other animals which are popularly and erroneously called by the name of rat, some of them not even belonging to the rodent tribe.

Ratel, *rat'-tle*, a large weasel found in Africa and India (*Mellinora Ratel*), which is remarkable for its fondness for honey. It will tear to pieces a nest of the honey-bee, and devour the combs, honey, and brood, without caring for the stings of the insects, from which it is defended by its thick fur. The colour of the Ratel is white-grey above and deep black beneath, the line of demarcation being very distinct. It is about three feet in length.

Rattlesnake, *răt'-tl-snaik*, (*Crotalus*,) a gen. of American serpents, famous for the danger of their bite and the peculiar appendages to their tail, consisting of several horny membranous cells, of an undulated pyramidal figure, articulated one within the other, so that the point of the first cell reaches as far as the basis or protuberant ring of the third, and so on; which articulation being very loose, gives liberty to the parts of the cells that are inclosed within the outward rings to strike against the sides of them, and so produce the rattling noise which is heard when the snake shakes its tail, and from whence it derives its name. The head is broad, triangular, and generally flat in its entire extent; the eyes are very brilliant, and generally provided with a nictitating membrane; the mouth very large, the tongue forked at its extremity. The body is robust, elongated, cylindrical, covered above with carinated scales. The tail is short, cylindrical, and somewhat thick. The number of the little bells which terminate it increases with age, an additional one being formed with every casting of the skin. The noise made by them resembles that made by crumpled parchment, or by two quills of a goose rubbed against each other. Their fangs, which are two in number, one at each end of the upper jaw, are traversed by a canal for the emission of the poison, and when not used, remain concealed in a fold of the gum. The fangs are very sharp at the points, rather slender in proportion to their length, and awl-shaped, or adapted for inflicting punctured wounds only, and not for tearing or lacerating. The poison is secreted by a considerable gland, situated on each side of the head, immediately under the eye; and the same muscular action which forces the tooth into the body of the prey, compresses the reservoir of venom, and so forces it through the canal of the fang into the wound. The smell of these serpents is exceedingly offensive, even when they are alive, arising, it is supposed, from the rapidity with which the flesh of those animals on which they feed putrefies, from the action of the virus upon it. Their chief food is birds and squirrels; but they also devour rats, hares, and small reptiles. Their glance has been said to have the power of fascinating their prey, so as to make it drop into their mouths; but there can be little doubt that, if this power exists, it has been greatly exaggerated. That a suddenly surprised animal should be arrested by terror, and easily fall a victim to the serpent, is highly probable; but that it should descend to its destruction from the top of the loftiest trees is almost incredible. The movements of the rattlesnake are slow, and it never appears to use its weapons unless when compelled thereto, either by necessity or fear. As they are no climbers, and their motions on the ground are so slow, and so much in a straight line that they would have little chance of capturing any prey by pursuing it, they usually rest twisted in a spiral form in the usual path of wild animals, particularly in those which lead to the water. They will not spring upon any large animal they are unable to swallow, unless they are reduced to extremities by impending hostilities; and most of those persons who have been bitten by them have thus suffered in consequence of treading unawares upon them, or making an unskilful attack. The remedies employed against the bite of the rattlesnake are suction, ligatures, caustics, and internal medicines. Till the month of July, their bite is comparatively harmless. All the species of *Crotali*, whose country is well known, are natives of the American continent; and some of them, though the winter is much colder than in the same parallel of Europe and Asia, are found much farther north than any serpent of nearly the same deadly venom is met with in the Eastern continent. Those which are found far to the north are torpid during the winter, whilst those in the tropical parts of the country are never torpid, though they remain in hiding-places during the rains. Rattlesnakes are viviparous, and live a long time, some having been found, it is said, with from forty to fifty pieces in their rattles, and from eight to ten feet in length. It is said that the snakes attain annually a fresh ring to the rattle, so that the age of a rattlesnake can always be ascertained by counting the rings of the rattle.

When shaken by hand the sound is not very loud, but when urged by the snake itself the rattle becomes almost invisible from the rapidity of the motion, and produces a sound which much resembles the noise of steam let off from a railway engine. In a room, the sound is almost deafening. The snake cannot produce this noise when the rattle is wet, so that the keepers at the Zoological Gardens can always stop the snakes from rattling by pushing them into the water. They traverse with ease rivers and lakes by swimming. Several species of rattlesnake are known—namely, the ordinary species, (*Crotalus durissus*,) the Banded Rattlesnake, or Cascavel, (*C. horridus*,) and the small, or Miliary Rattlesnake, (*C. miliaris*.)

Raven, *rai'-ven*, (Sax. *hræfn*, probably from Sax. *hrefian*, to plunder, to rob,) (*Corvus Corax*).—The generic characters of the raven are,—beak straight at the base, compressed at the sides, curved towards the point, and sharp at the edges. Nostrils basal, open, hid by stiff feathers directed forwards. Wings pointed, the first primary of moderate length, the second and third shorter than the fourth, which is longest. Feet, three toes before, one behind, almost entirely divided; tarsus longer than the middle toe. The great geographical range of the raven north of the equator causes it to be exceedingly well known, and it is as universally recognised in many other parts of the world as it is in this country. It is, in fact, a universal species, found both in the old and new continents,—from Greenland to the Cape of Good Hope in the one, and from Hudson's Bay to Mexico in the other. It is one of the few birds that are capable of braving the severity of an arctic winter and the scorching rays of a tropical sun, without any change being produced in its plumage by the extremes of climate. It is by far the largest specimen of the genus to which it belongs, (*Corvidæ*,) and being bold as well as sagacious, is always an object of suspicion to shepherds and husbandmen; for no sooner does an animal show any signs of weakness, than the raven is on the watch for an opportunity to satisfy his appetite. If no interruption occurs, he makes his first attack upon the eye of the defenceless animal, afterwards feeds at his leisure, retires to digest his food, and then returns to feed again. Like the other birds of its genus, it is not particular as to its food, eating indiscriminately small animals, such as rabbits, birds or their eggs, reptiles, insects, grain, or carrion, and any dead fish or other animal substance which may be washed ashore by the tide. Its favourite abodes are high rocks on the sea-shore, extensive woods, mountains, or open plains. The female breeds early in the season, and by the beginning of February the ravens may be seen visiting and repairing their nest of the previous year, which is usually placed in a very high tree, in the fork of a branch. It is formed on the outside of sticks, with a lining of wool and hair; the eggs are four or five in number, two inches in length, by one inch four lines in breadth, of a pale green ground-colour, spotted and speckled with darker greenish-brown. The incubation lasts twenty days, during which the male feeds the female as she sits upon the nest, and occasionally takes her place. When the young appear, they are for a time tended with great assiduity by their parents, but are driven away as soon as they are able to provide for themselves. Ravens live to a great age, and are considered to pair for life, and to occupy the same spot until driven away from it. Should both occupiers of any locality be killed, it is almost certain to be occupied by another pair. The raven measures fully two feet in length, and at least four feet in the stretch of the wings, and has the tail very firmly feathered, and equal in length to half the body. The plumage over the whole body is black, but glossed with blue reflections, which, in certain lights, give a very peculiar appearance. Cuvier and some authors mention that in the extreme north it is frequently found more or less white; but other authorities, including the famous explorator Sir James Ross, strenuously deny this. In former times, ravens were by no means rare birds in Great Britain; and, indeed, there used to be an allegorical saying in most parts of the country, that "every rock has its raven;" but they are now comparatively rare in England and in the south of Scotland. Ravens make no defence against any attempt by men or boys to rob their nest, but against the attacks of other birds they display great power as well as courage, and, at close quarters, are said to be a match for the more powerful falcons. There are several interesting peculiarities about the raven, one of which is its thievish habit of carrying off shining metallic substances, and other articles, totally unfit for food, or to be used in the construction of its nest; and another, its aptitude for imitating the human voice. The well-authenticated anecdotes in proof of its possession of this power are almost innumerable.

Ray, *ray* (Fr. *raie*, Sp. *raya*), (*Raiida*.)—The rays, or skates, are a very remarkable family of cartilaginous fishes, resembling in their physiology the shark family much more than any other, and following in their forms the angel-fish, or monk-fish, of that family. The generic characters are:—Form of the body rhomboidal, very much depressed; tail long and slender, generally armed on the upper surface with one or more rows of sharp spines; two small fins near the end of the tail, and sometimes a small terminal or caudal fin; the eyes and temporal orifices on the upper surface of the head, nostrils, mouth, and branchial apertures, beneath; teeth flattened, lozenge-shaped, the inner angle elongated in old males. The rays, or skate, as they are popularly called, are remarkable for the breadth of their bodies, contrasted with their long narrow tails; the great breadth of the body being produced by the expansion of what are called the pectoral fins, the base of each of which is equal to the whole length of the side of the fish. The ray may almost be considered as having no true head or neck, the sides of both being included, and thus protected by the expanded anterior margin of each pectoral fin. Their mode of progression is performed by a slight undulating motion of the pectoral fins, something between swimming and flying, and is very graceful. They defend themselves, it is said, by bending the point of the nose and the base of the tail upwards towards each other; the upper surface of the body being then concave, the tail is lashed about in all directions over it, and the rows of sharp spines frequently inflict severe wounds. The rays are very voracious. Their food consists of any sort of fish they can catch, with mollusca, testaceous or naked, and crustacea. Their jaws and muscles are so powerful that they are able to crush the strong shell of a crab with ease. As in the sharks, the females are larger than the males. The young are produced during the latter part of spring or during summer, and are deposited by the parent fish in thin horny cases, which are also called purses, and which on the coast of Cumberland bear the name of skate-barrows, from their resemblance in shape to a four-handed machine by which two men carry goods. As the young ray increases in size, the angular parts of the body curve over for a time, till the fish ultimately escapes to provide for itself. The eleven species of true rays which are found on the coast of Great Britain may be arranged in two divisions; the first of which contains seven species, having the skin perfectly smooth; whilst the second division contains two species with rough skins, and two which are furnished with numerous short, sharp spines on various parts of the surface of the body. The ray, or skate, as food, is held in very different degrees of estimation in different places. In London, large quantities are consumed, and the flesh is much esteemed; but on some parts of the coast it is seldom devoted to any purpose but as bait for catching crabs and lobsters. The ray is in best condition for the table during autumn and winter. In spring and the early part of summer they are usually maturing their eggs or young, and their flesh is then soft and woolly. There are many species of ray, among which may be mentioned the Sting Ray, (*Trygon.*) It is armed with a long and many-barbed spine, at the root of the tail, with which it can inflict very painful and dangerous wounds, lashing the long tail round the victim, and drawing the barbed spine so rapidly and sharply across the object attacked that frightful lacerations are caused. The Thornback Skate, (*Raia clavata,*) known by the numerous bony prickles upon the back and along the tail. The Eagle Ray, (*Myliobatis,*) sometimes called the Whip Ray, from the great length and tenacity of its tail. The Horned Ray, or sea-devil (*Cephaloptera*) of the Mediterranean, which has been known to reach the enormous length of twenty feet, and which is usually caught by harpoons. For Electric Ray, *see* TORPEDO.

RAZOR-BILL, *ray-zor*. One of the auks, (*Alca torda,*) so called from the shape of its beak. It is a British bird, but not very common. (*See* AUKS.)

RAZOR-SHELL. (*See* SOLEN.)

RECURVIOSTRA. (*See* AVOCET.)

RECTUM, *rek'-tum*, (Lat., straight,) in Anat., is the name given to the last portion of the large intestines, so called from an erroneous notion among the old anatomists that it was straight. It commences at the sigmoid flexure of the colon, and terminates in the anus. It is cylindrical in shape, and not sacculated like the colon, and is narrow at its upper part, becoming gradually dilated towards its termination, just above which the dilatation is considerable.

REDBREAST, *red'-brest*, (*Erythacus rubecula.*) —This bird, which is commonly called the robin, or robin redbreast, is generally diffused over England, Ireland, and Wales, and is also an inhabitant of the most northern counties of Scotland. It also visits Denmark and Sweden in the breeding season; and amongst the summer visitors to the latter country, it is said to be one of the first to arrive and the last to go. It is a constant resident throughout the year in the temperate and warmer parts of Europe, abundant in Spain and Italy, from the last of which it passes over by Sicily and Malta to North Africa. In the adult male bird, the beak and irides are black; upper parts of the head, neck, back, upper tail-coverts and tail-feathers, a yellowish olive-brown; quill-feathers rather darker, the outer edges olive-brown; greater wing-coverts tipped with buff; over the base of the beak, round the eye, the chin, throat, and upper part of the breast, reddish-orange; encircling this red is a narrow band of bluish-grey, which is broadest near the shoulders; lower part of the breast and belly white; sides, flanks, and under tail-coverts, pale brown; under surface of wing and tail-feathers dusky grey; legs, toes, and claws, purple-brown. The whole length of this bird is nearly six inches. The length of the wing, from the carpal joint to the end of the longest quill-feather, three inches; the first quill-feather but half the length of the second, which is not quite so long as the sixth; the third, fourth, and fifth, nearly equal, and the longest in the wing. The female is not quite so large as the male, and her colours are less bright. The redbreast is subject to variation in the colouring of the plumage. White, and partly white, varieties are not uncommon. During summer, it feeds indiscriminately on earthworms, insects, fruit, and berries. In winter, when pressed by hunger, it hovers round human habitations, both in town and country, and becomes a welcome pensioner. The redbreast, in common with some other birds, is remarkable for the peculiarity of the situation in which it sometimes builds its nest; one pair, for instance, having built theirs in a sawpit whilst it was in constant use. But stories of this sort are almost innumerable. The robin breeds early in spring; its nest is formed of moss, dead leaves, and dried grass, lined with hair, and sometimes a few feathers; the nest is frequently placed on a bank sheltered by brushwood, or a short distance above the ground in a thick bush or lane-hedge, sometimes in a hole in the wall, partly covered with ivy. The eggs are from five to seven in number, white, spotted with pale reddish-brown; the length nine lines and a half, by seven lines and a half in breadth. The song of the robin is short and sweet, but not powerful. It is a light, lively song, and uttered at short intervals, particularly if two birds are singing against each other from neighbouring trees, a circumstance which often happens.

REDSTART, *red-start.*—A familiar bird, belonging to the family Luscinidæ, (*Ruticilla phœnicusa,*) which derives its name from the ruddy feathers of the tail and upper tail coverts, which are suddenly exhibited when the bird takes to flight, and which contrast boldly with the jetty hue of the throat and skin, and the grey of the body. The nest of the redstart is almost always placed in a hole of a wall or rock.

REDTHROAT. (*See* CAPEUNA.)

REDWING, *red-wing.*—One of the British thrushes (*Turdus iliacus*), which derives its name from the patch of orange-red feathers under the wings. It seldom builds in England, going for that purpose to the north of

Europe. The birds assemble in considerable flocks just after they arrive in England and before they depart, so that the fowlers always choose these periods for capturing them.

Reeve. (*See* Ruff.)

Regulus. (*See* Golden-crested Wren.)

Reindeer, *rain'-deer*, (Sax. *hrana*, Dut. *rendeir*, Ger. *Rennthier*,) (*Tarandus rangifer.*)—This animal has a multitude of synonyms, and by English writers is called indiscriminately the reindeer, caribou, and Greenland buck. It is a native of the Arctic circle in Europe, Asia, and America. It is about the size of our stag, and has the horns elongate, subcylindrical, and with the basal branches and tip dilated and palmated. It varies exceedingly in size; some of the specimens in the British Museum being forty-one inches, and others fifty inches high, at the withers. There are several varieties. In the fur countries there are two varieties, one confined to the woody and more southern district, and the other retiring to the woods only in winter, and passing the summer on the coast of the Arctic seas. A large variety occurs in Siberia, which the Tungusians use for draught. In Newfoundland, also, there is a large variety, nearly as large as a heifer, which has very large and heavy horns. In the north of Europe the reindeer is domesticated, and its services are invaluable. Possessing the reindeer, the Laplander can dispense with the services of horses, sheep, and oxen; for it will carry him in his sledge over the snow thirty, forty, or fifty miles a day, and can travel with a weight of two hundred pounds on its back. The law, however, restricts the burden of the reindeer to one hundred and thirty pounds. Its milk provides him with cheese; its flesh supplies him with food; and its skin furnishes him not only with clothing, but with tents and bedding. In winter, the hair of the reindeer is long, thick, grey-brown; neck, rump, belly, ring round the hoof, and end of nose, white. In summer, the same animal has short, dark, sooty-brown hair, with the parts which are white in winter being rather paler grey-brown. The hair of the body is so thick that the skin cannot be seen when it is put aside; for it stands erect, as in other animals of the same genus, but is much thicker. The size of the reindeer, as already stated, varies considerably, and increases in proportion to its proximity to the pole; the reindeer of Norway and Sweden being small when compared to those of Finmark and Lapland, which, in their turn, yield to those of Spitzbergen, while these again fall short of the more polar races. The reindeer, when wild, travel in herds, varying in number from eight or ten to two or three hundred; their daily excursions being generally towards the quarter from which the wind blows. Even in the winter, the reindeer contrives to procure food, for it lives much on lichens, and has the instinct to discover its food even when buried under deep snow. By means of the hoof and snout, the snow is scraped away, and the lichen laid bare. The Indians kill them with bows and arrows. They also take the reindeer in snares, or spear them as they are crossing rivers or lakes. The Esquimaux take them in traps ingeniously formed of ice and snow. The reindeer has been known to travel at the rate of nineteen English miles an hour, and on one occasion one travelled eight hundred English miles in forty-eight hours.

Remipes, *ree'-mi-pees.*—A genus of crustacea, called popularly Oar-foot Crabs, because the false feet are modified into flat, oar-like appendages. The tail is furnished with a long flat blade, which answers the purpose of a rudder. They are found in New Holland.

Reproduction, *re-pro-duk'-shun*, (Lat. *reproduco*, I reproduce.)—This term is sometimes used in Physiol. to signify generation; it is, however, more especially employed to denote those processes in organic beings by which the individual being is produced, developed, and maintained. In this way it has been employed to denote several processes which are functionally distinct, or have very different ends in the economy of nature. The result of the ordinary processes of nutrition is the constant reproduction of the same tissue in the same parts, and is therefore the means by which the form of a being is maintained during life. Through the whole of the animal and vegetable kingdoms this function is carried on until the death of the whole or part of the being. However, this power of reproducing the same tissues varies in different beings; and while a lost limb can be restored to the lower animals, no such power belongs to the more highly-organised animals or plants. The origination of the germ from which individual animals and plants grow is sometimes called reproduction. In this way the production of cells, by which the life of the individual is maintained, is called *reproduction;* while the arrangement by which its existence as an individual is insured is called *generation.* In the ordinary reproduction of the tissues of animals and plants, each cell has the power of producing other cells, or a large number of the same kind of cells are produced simultaneously; in generation, on the contrary, it is necessary that two cells should take part. The two cells thus engaged have been termed the *germ*-cell and the *sperm*-cell. The former is that in which the process of growth of the new being commences, whilst the latter is that which communicates the growing tendency to the former. In the animal and vegetable kingdoms these cells are of different sizes and forms, and placed in various positions relative to other organs; the means also by which they are brought together vary, but they perform the same fundamental functions in all cases. The most profound mystery in the generation of animals and plants is the reason why the same apparent combination of elements should assume a particular form. Between the cells of the flowers of the oak and the apple no difference can be discerned; nevertheless, one always produces oak-trees and the other apple-trees. In animal life it is the same; there is no appreciable external difference in the cells; but one set will produce one species of animal form and another set another species. This fact has led some physiologists to assume the existence of a *vital principle;* that is, of a distinct and independent essence, giving to each species its definite form and character. Three conditions must be regarded in studying the phenomena of reproduction and generation. First, the *formative force,* which is peculiar in every species, and similar in all the generative cells produced in that species. Secondly, the *physical conditions* in which the generative cells are placed: these are more especially heat and light, and the condition of the membranes of the cell, through which absorption goes on. Thirdly, the *elements* which are supplied for the nourishment of the new being, and which, by their chemical properties, are capable of exercising an influence on the form and development of the animal or plant. (*See* PHYSIOLOGY.)

REPTILES, *rep'-tiles*, (*Reptilia*,) a class of animals belonging to the sub-kingdom *Vertebrata*, and embracing the creatures usually known as crocodiles, lizards, turtles, tortoises, and serpents, and placed, in zoological arrangement, between birds and fishes. The species are not so numerous as those of mammalia and birds, and the numbers found in cold and temperate climates are few in comparison to those existing in hot climates. The word *reptile* is derived from a Greek word signifying to crawl or creep; but this is not very descriptive of the whole of the order, neither is it expressive of a kind of motion which is peculiar to those animals which the order includes. Among reptiles, too, there is to be found every kind of motion which is found among any of the other three orders of vertebrated animals; but it is not performed by means of organs exactly similar, or in exactly the same style. Thus, for instance, many reptiles walk, run, or leap, but their limbs are not articulated like those of the mammalia. Some reptiles are capable of performing a sort of flight; but they do it by means of membranes, like the flying squirrels, and not of any organs resembling wings, properly so called, like those of the bats or birds. Again, those that swim—and many of them are excellent swimmers—do not perform the motion by anything resembling fins, but by the flexure of the body or the action of the limbs. Reptiles are distinguished from the other classes of vertebrated animals by their having neither hairs on their body nor teats, like the mammalia; by their body being never covered with feathers, like birds; whilst their possessing feet and a tail, in form resembling those of quadrupeds, separate them from fishes. They are air-breathing animals, and cold-blooded. The skin is clothed with horny imbedded plates, or imbricated scales, which are covered with a thin and often deciduous epidermis. Their lungs are cellular, and their heart is trilocular—*i.e.*, has only three divisions, so that the blood can only be imperfectly aerated. With only one or two exceptions, they are oviparous, and the young undergo no transformation after birth. Reptiles, by the latest systematic zoologists, have been divided into two sub-classes: 1. Those, the bodies of which are covered with overlapping scales, such as the lizards and serpents—*Squamata*, the scaly reptiles; and 2. Those, the bodies of which are covered with square imbedded plates, as the tortoises and crocodiles, &c.—*Cataphracta*, the shielded reptiles. Formerly the frogs and toads, &c., which have the skin naked and covered with mucus, formed a third sub-class, under the name of *Batrachia;* but they are now considered to form a separate class. Reptiles are very tenacious of life, and in many of them a limb, or a part of a limb, will sprout again and grow, and come to be useful after it has been completely taken away; being in this particular completely unlike the other vertebrata, and assimilating to some of the animals that have no skeletons, and nothing that can be called a centre of organization,—to the crustacea, for instance. The bones of the small reptiles are of the same structure throughout, without any cells for containing marrow; but in the larger *sauria* there are such cells, though comparatively few in number. The cranium, or bony protection of the brain, is very small in all reptiles, although the vast projection of the jaws in some species makes the head appear large. The vertebral column varies much in reptiles; in some of them there being hardly any distinction of articulated parts, whilst in others there are some of the most varied and perfect motions in the whole mechanical structure of animals. Though the muscles of reptiles have great irritability, and this continues long after death, it does not appear that they have much sensibility, properly so called, or that their motions and the effects of external impressions upon them are productive of as much pleasure or pain as those of birds. They have some of the organs of local sense well developed, and others very imperfect. Sight appears to be their most perfect local sense; the eyes of most being well formed and ready in use. As to hearing, on the other hand, there are few or none of them that have external ears except the crocodile, and although never entirely wanting, the internal parts of the ear in all of them are somewhat imperfect. The organs of tasting and smelling are also not of the most perfect kind.

RESPIRATION, *res'-pe-rai'-shun*, (Lat. *re*, and *spiro*, I breathe,) in Phys., is the alternate inspiration and expiration of atmospheric air. The blood which circulates through the system requires for its purification and the restoration of its vital qualities, to be brought into contact with the atmospheric air; and this is effected in the lungs. The air brought into contact with the blood is decomposed, its oxygen uniting with the blood, while its nitrogen is returned by expiration unchanged, with an additional quantity of carbonic acid gas. The mechanical part of the function of respiration is effected by the action of the ribs and diaphragm. About twenty respirations take place in a minute, and from thirty to forty cubic inches of air are inhaled at each inspiration. (*See* LUNGS.)

RETE MUCOSUM. (*See* SKIN.)

RHAMPHASTOS. (*See* TOUCAN.)

RHEA, *ree-ah*, a well-known bird, belonging to the Struthionidæ, and popularly called the American Ostrich. It is found plentifully on the plains of La Plata, and is generally found in pairs, although small flocks are occasionally seen. The hunters are in the habit of chasing it on horseback, and bringing it down with the terrible "bolas"—*i.e.*, a long leathern thong with a leaden ball at each end. This weapon is thrown at the Rhea, and twists round its legs and neck so as to throw it down and to bind its limbs at the same time. The male bird sits on the eggs, which he rolls together, while the female seems to take no trouble about them. Three species of Rhea are known.

RHESUS. (*See* BHUNDER.)

RHINOCEROS, *ri-nos'-e-ros*, (Gr. *rinokeros*,) the name of a genus of pachydermatous quadrupeds, having each foot divided into three toes, and furnished with one or more horns on the snout. They were well known to the ancients, and are frequently alluded to by the writers of past ages. The first rhinoceros, however, seen by modern Europeans, appears to have been a one-horned rhinoceros sent from India to Emmanuel, king of Portugal, in 1513. No two-horned rhinoceros seems to have been brought alive to Europe in modern times. The bony framework of the animals of this genus approximates to that of the *hyrax*, the tapir, and the horse, among living genera; but, although a general resemblance pervades the entire skeleton of the animals of this genus, there are certain differences, in the skull especially. The rhinoceros, generally speaking, is a clumsy-looking animal; the upper lip is very large, and overhangs the lower, and, being furnished with strong muscles, is employed by the animal somewhat as the elephant uses his trunk. The ears are large, erect, and pointed. The skin is naked, rough, and extremely thick,—about the neck it is gathered into large folds; a fold also extends between the shoulders and fore-legs, and another from the hinder part of the back to the thigh. The tail is slender, flat at the end, furnished at the sides with very stiff black hairs. The legs are very short. The rhinoceros lives in shady forests adjoining rivers; or in swampy jungles. Though possessed of great strength, and more than a match for either the tiger or the elephant, it is quiet and inoffensive unless provoked. Its chief food is canes and shrubs, roots and small branches of trees. Its senses of smelling and hearing are very acute, but its sight is by no means vivid. The female produces one at a birth. The growth of the young is very gradual, and at the age of two years it scarcely attains half its height. There are several species of rhinoceros; of which we may particularise the Indian rhinoceros, (*R. unicornis*,) which has only one horn, and is a native of India, and particularly of that part which lies beyond the Ganges; and the African or two-horned rhinoceros, (*R. bicornis*, sometimes called Borele,) which is a native of Africa, and resembles the preceding in many particulars, but differs in being provided with an additional horn, of a smaller size, situated nearer the forehead; in the fact that the horizontal contour of the bones of its nose is rounded, whilst in the one-horned species it is pointed; and that its skin is not thrown into the folds, so remarkable in the latter. The two-horned rhinoceros was the one best known to the ancients, and is frequently represented on their coins, especially those of Domitian. Strabo, however, gives a clear description of one that was one-horned. When full-grown, the Indian rhinoceros is about eight or nine feet in length, whilst the African rhinoceros is found as long as twelve feet or more. The rhinoceros of Java (*R. sondiacus*) is another species, with only one horn, and is even smaller than the Indian species, its length from the membrane of the tail to the tip of the nose being about eight feet, and its height not more than four. Its horn always appears to be much used by the animal in some operation or other, for it is ground or rubbed down, and is sometimes reduced to little more than an inch in length. The skin of this species is very much plaited behind the shoulders, under the neck, and on the outsides of the legs, and is roughened by prominent tubercles, for the most part in the shape of regular pentagons, well defined. The Indian and Java rhinoceros are the only one-horned species which are now to be found in the living state; and as the greater part, if not the whole, of those which are found fossil in the colder latitudes, appear to have had two horns, the one-horned species would seem to have been, in all ages of the world, confined to the localities in which they are now found. It is worthy of notice that the skin of the two-horned ones is more free from plaits and tubercles, and more plentifully covered with hair, than are those which inhabit the most equatorial climates. Another species, the Sumatran rhinoceros, (*R. sumatrensis*,) is a smaller species than the two-horned rhinoceros of Africa, but, like that, is more an animal of the interior of the country than the Indian species, or that of Java. In the specimens that have been seen by Europeans, it is only five or six feet in length, and between three and four in its greatest height. Its skin is without the decided folds which mark the single-horned ones, and also the wrinkles which more or less pucker the skin of the African species, and is altogether softer and thinner than that of the others. Though there are considerable differences of size among the living species of the genus, they are all large animals, and powerful in proportion to their size; and, as existing, are all natives of the eastern continent, and the most tropical parts of it. As now existing, the rhinoceros may be considered as the most aquatic of all the *pachydermata*, excepting the hippopotamus, and the ones which, next to it, feed upon the rankest and coarsest vegetation. They have a little tendency to be gregarious, but never assemble in such herds as the elephants. Their aspect cannot be said to be absolutely ferocious; but the pointed form and motion of the upper lip, which projects considerably beyond the lower lip, gives them a snarling appearance. One of the most curious species of this group is the Kobaoba, or Long-horned Rhinoceros, (*R. oswellii*,) which lives far in the interior of South Africa. The horn is very long, nearly straight, and projects so much forward, that when the animal runs, the tip of the horn nearly touches the ground. The horn is very valuable to the natives, who make of it the best and handsomest "knob-kerries"—*i.e.*, staves with a large knob at one end, which are used for striking and for hurling. Some time ago, there was in a shop window in the Strand one of these Kobaoba knob-kerries, which was fully three feet in length, and which was afterwards dressed down and polished into a walking-stick. The mother rhinoceros uses her horn as a mode of directing the movements of her young as it runs before her. The skin of this species is not so wrinkled as is usual among the group, and it is nearly devoid of hair. Its colour is whitish.

Rhinolophus, *rine-ol'-of-us*, generic name of the Horseshoe Bat. This curious animal derives its name from a leaf-like membrane upon the nose, the lower part of which is shaped like a horse-shoe, and the upper part is sharp and pointed. These two portions are separate from each other. (*See* Bats.)

Rhizomys, *ri'-zo-mis*, a genus of rodents remarkable for their very small eyes and ears. A good example of this genus is the Bay Bamboo Rat, (*R. bodius*,) which inhabits Malacca and China. It is about as large as a field rabbit, and is very hurtful to the bamboo, on the root of which it feeds. The front of the incisor teeth is bright red.

Rhizopoda, *rize-op'-od-a*, a group of marine beings, very low in the scale of motion, and having no external agency. Their form is unstable, and they progress by means of processes thrown out of every part of the body, and retracted when not required. The rhizopoda comprise the animals which constructed the *miliola* shells found in such large quantities in the strata of many quarries near Paris. The class also includes some other microscopic foraminiferous shells.

Rhoode-bok, *rood-ee-bok*, a pretty antelope of Southern Africa, (*Cephalopus Natalensis.*) In some places it is very plentiful, but the approach of civilisation always drives it away. It is of a reddish-brown colour. (*See* Cephalopus.)

Rhyncops. (*See* Scissor-bill.)

Ribbon-fish, *rib-bon*, a Deal fish, (*Trachypterus,*) a remarkable fish of the northern seas, that is flat like a ribbon, and has the dorsal fin extending along the entire back. It sometimes reaches the length of six feet.

Ribs, *ribz*, (Sax.,) in Anat., are the long curved bones which form the walls of the chest. They extend in an oblique direction from the vertebræ of the back to the sternum in front. They are usually twelve on each side; but in some rare cases thirteen have been found, in others only eleven. They are distinguished into true and false; the former being the seven upper ribs, which are articulated to the sternum; the latter the five lower ones, which are not immediately attached to that bone. The use of the ribs is to cover and defend the lungs and heart; and their articulations with the vertebræ and sternum admitting of a slight motion, they assist in respiration. (*See* Anatomy, Thorax.)

Rice-troopial. (*See* Bob-o-link.)

Riet-bok, *reet-bok*, a fine South African antelope, (*Eleotiagus arundinaceus,*) which is generally found among reeds or long grasses. It is called Inghalla in some places, and Uniseke in others. It is about three feet in height, and its colour ashen-gray above and white beneath. The horns are about one foot in length.

Rifle-bird, *ri-fel*, a beautiful Australian bird, allied to the Hoopoes, remarkable for the deep velvety black of the body, and the particles of emerald green upon the head and throat. It has very short wings, and never flies far, but contents itself with a short, jerky flight from one tree to another. Its scientific name is *Ptiloris paradiseus.*

Riman-dahan, *ri-man-da-han'*, one of the handsomest of the felidæ, (*Leopardus macroscelis.*) This beautiful creature lives in Sumatra, where it is popularly called the Clouded Tiger. Specimens have long been in the Zoological Gardens, and are very tame. The fur is rich fawn, decorated with large patches and streaks of velvet black. It is not much dreaded by the natives, but it is apt to do great damage to the poultry, stealing into the enclosures, and making sad havoc among the birds.

River Jack. (*See* Das Adder.)

Roach, *roatsh*, (Sax. *hreoce*,) (*Leuciscus rutilus.*)—The roach is a fish about twelve or fifteen inches in length. The length of the head, compared with the whole length of the fish, is as 1 to 5; the depth, at the commencement of the dorsal fin, is to the body alone (without the head or tail) as 2 to 5. The scales are large. The colour of the back and the upper part of the head is bluish-green or dusky-green, becoming lighter on the sides of the body, and shaded into silvery-white on the belly. The dorsal and caudal fins are dusky, tinged with red; the anal, pectoral, and ventral fins are bright red; the irides bright yellow. The roach is common in most parts of Europe; swims in large shoals, and frequents rivers, lakes, &c., preferring somewhat still and deep waters, feeding upon worms and aquatic vegetables. The roach spawns at the end of May or the beginning of June, and the scales are then rough to the touch. It is in little estimation generally for the table, but is best for food as well as finest in colour in October. The proverb, "As sound as a roach," is probably derived from the French; for in the older ichthyological works this fish was called *roche;* and the meaning stands confessed, if we admit the pun upon the word, and we ought then to read "as sound as a rock."

Robber-Crab, *ro'b-bur*, or **Purse-Crab**, a remarkable crustacean allied to the Hermit Crabs, but needing no supplementary shell. It inhabits many islands of the Indian Ocean, and is of large size, standing nearly a foot in height when walking. It feeds upon cocoa-nuts, and is able to open them with perfect ease. With its powerful claws it tears away the thick fibrous envelope, and carries the bundle of fibres into its hole. It then works the small joint of its claw into the soft hole at the end of the cocoa-nut, and, by banging the fruit against a stone, breaks it, and then eats the interior. Sometimes it contents itself with boring a large hole in the shell, and thus extracts the kernel. So plentiful are these crabs in some places, that the Malays dig out the stores of cocoa-nut fibre, and use it for caulking their canoes. The length of the robber-crab is between two and three feet.

Rock, Cock of the. (*See* Cock of the Rock.)

Rock-fish. (*See* Gobies.)

Rodentia, *ro-den'-she-ă*, (Lat. gnawers,) an order of animals belonging to the class Mammalia, embracing the rats and mice, hares, rabbits, guinea-pigs, and other well-known animals. These animals have two great incisor teeth in each jaw, separated from the molar by a wide space, with which they could hardly seize a living prey or rend flesh; they could not even cut aliments, but they might serve for reducing them, by continued labour, into fine molecules—in a word, for gnawing them; whence the term Rodents, or Gnawers, applied to this order. As these incisors have enamel in front only, their posterior border wears away more than their anterior edge, so that they are always kept set like a chisel, and enable their owner to attack the hardest vegetable productions, and frequently to feed on wood and bark. It is a remarkable fact, that in the manufacture of chisels man has hit upon a plan which was in active operation as soon as rodent animals were placed on the earth. Chisels are not made entirely of steel, but a very thin steel plate is welded to a thick iron plate, the steel being intended to furnish the cutting edge, and the iron to strengthen and protect the steel. So in the rodent tooth, the cutting edge is obtained from the plate of enamel, and the strength from the bony portion of the tooth. Their prismatic form causes them to grow from the root in proportion to the wearing down of their cutting edge; and this disposition to grow or push forward from the root is so strong, that if one of them is lost or broken, its antagonist, meeting with no opposition to keep it within bounds, develops itself so as to become monstrous. The lower jaw has no horizontal movement except from behind, forwards, and *vice versâ*, convenient for the action of gnawing; the molars consequently have flat crowns, the enamelled eminences of which are always transversal, so as to be in opposition to the horizontal movements of the jaw, and to be better adapted for trituration. In some genera these eminences are simple lines, the crown of the tooth being very flat, and these are more exclusively frugivorous; in others the eminences are divided into blunt tubercles, and these are omnivorous; whilst, in a few others again, the teeth have points, and the animals belonging to these genera more willingly attack other animals, and approximate to the *carnivora*. The hinder parts of the body of the rodents in general exceed their anterior ones, and this gives them a disposition to leap rather than walk. The brain of the rodents is nearly smooth, and without convolutions; the eyes are entirely directed laterally; the jaws are weak, and the fore-arms have scarcely any rotatory motion, and their two bones are nearly united. In the greater part of the details of their organisation the inferiority of the animals is displayed; but some of them enjoy a certain dexterity, using their fore-feet for carrying their food to their mouth; whilst others, again, (the squirrels,) climb trees with facility. Rodents are most abundant in temperate regions. In Europe and the north of Asia there are 81 species, 16 genera; in North America, 99 species, 19 genera; in Africa, 53 species, 16 genera; in India and its islands, 58 species, 10 genera; in South America and West India Islands, 89 species, 25 genera. About six species of rodents are found in Australia, and they all belong to the family *Muridæ*.

Roebuck, *ro'-buk*, (Dan. *raabuk*,) (*Capreolus Capræa*.)—This, the most light and handsome of all our deer, is about 3 feet 9 inches in length, about 2 feet 3 inches in height in front, and about 2 feet 7 inches in height behind. Weight, from about 50 to 60 lbs.; length of horns, from 8 to 9 inches. The horns are cylindrical, with a small antler on the middle of the horn, pointing forward, and a second one higher up, and turned to the rear. Their lower part is deeply furrowed longitudinally. Those of a young buck in its second year are simple; in the third year a branch appears; the head is complete in the fourth year. The colour of the hair is a grayish-yellow, varying more to reddish or brownish, but always with a large white disc on the buttocks. The lower part of each hair is ash-coloured; there is a narrow bar of black near the end, and the tip is yellow. On the face the hair is black, tipped with yellow. The summer and winter clothing differ a little, both in colour and texture; in summer the coat is short and smooth, and of a bright reddish colour; whilst in winter the hair thickens and hardens, and the colour deepens, especially on the upper part. The roebuck is pretty generally distributed, being found in all the temperate parts of Europe and Asia, and even, it is said, in India. The roebuck was formerly very common in Wales, the north of England, and in Scotland, but at present the species no longer exists in any part of Great Britain except in the Scottish Highlands, where they are not met with in exactly the same places as the red deer, but rather where there is an admixture of hill and rock and copse. The roebuck does not keep in herds, but only congregates in families in the lower coverts and less wild woods. The male is monogamous, and remains attached to one female for life, the two keeping company, or at least being near to each other, all the year round; and the rutting season is not accompanied with that violent excitement which takes place in the others, more especially in the stag. Rutting time is in the beginning of November, and the female goes little more than five months, while the fallow-deer goes eight months, and the hind a little more. The pairing is thus about two months later than the others, and the fawns are dropped about two weeks earlier. The female produces two fawns at a birth, and these she conceals from the male. They are said to live twelve or fifteen years, and to be able to reproduce the species at the age of eighteen months. Herbage and tender shoots of underwood are the food of the roebuck in summer, and in winter, when the ground is covered with snow, it feeds on the tender branches of the fir and the birch. As it prefers the tender twigs and buds of young trees to grass, it is very destructive to young plantations. The male sheds his horns soon after the rutting season, and acquires the new ones during the winter, so that he is in his apparel for a much longer period of the year than the hart or the fallow-buck.

Rollers, *roal-lers*, a group of birds belonging to the crow family, and remarkable for the beauty of their plumage. The best known species is the Garrulous Roller, (*Coracias garrula*,) which is sometimes seen in this country. The general hue of this bird is verditer green, the shoulders are blue, and the back is rich, ruddy brown. The wing feathers are deep black.

Rook, *rook*, (Sax. *hroc*,) (*Corvus frugilegus*.)—This well-known gregarious and familiar bird, which is to the inhabitants of well-cultivated countries the most interesting of the whole family of the *Corvidæ*, is spread over the greater part of Europe, but is nowhere more abundant than in Great Britain and Ireland. Wooded and cultivated districts are its favourite haunts. There are few in the more northern parts of Scotland, none in Orkney and Shetland, and they do not appear to be numerous either in Denmark, the southern districts of Sweden, in Russia, or Northern Asia. In Italy it is common and permanent, and abounds in France; but it appears to be migratory over a part of the continent of Europe. The rook is about twenty inches long, and forty in the stretch of the wings. It is distinguished from the raven and the crows by having a bill of an entirely different character from theirs, it being nearly straight, and having much less of the predatory character. Its bill is bluish-black, with a portion of the skin at the base bare of feathers in the full-grown birds, and covered with a scaly scurf of a whitish colour; but in the young birds this portion is covered with feathers, which are projected a little way over the base of the bill. The whole of the plumage is black, but glossed with reflections of purple, violet, and blue, which are very rich and beautiful when the bird is in good condition. The legs and claws are also generally of a black colour. Specimens are sometimes, but rarely, met with which are white, piebald, or yellowish. Every spring the rooks resort to breed on the same trees, preferring the loftier branches, and building sometimes ten or twelve nests, which are one above another, on the same tree, whilst a great many trees, thus furnished, occur in the same forest, or rather in the same district, and form what is called a *rookery*. As soon as rooks have finished their nest, and before they lay, the males begin to feed the females, and continue to do so through the whole season of incubation. The stick-built nest contains four or five pale greenish eggs, blotched with dark greenish-brown. Both the male and the female are very assiduous in feeding their young, and the skin under the tongue may, at this season, be often seen dilated into a kind of pouch by the collected food. Grain and insects especially form the food of the rook, and it repays the farmer for the seed by the assiduity with which it clears his land of wireworms and the larvæ of the cockchafer.

Rooye-bok. (*See* Pallah.)

Rorqual, *ror-qwal*, the largest known species of whale, (*Physalus boöps*,) which sometimes attains a length of one hundred and twenty feet. It is remarkable for the longitudinal folds of the throat, and under-parts of the body, a peculiarity from which it derives its Norwegian name of Rorqual, or Folded Whale. It inhabits the Northern seas, but is seldom harpooned, as its whalebone is very short, the blubber is scanty, and the animal is so swift and strong that its capture is a work of great labour and danger. The whales that are stranded on our coasts generally belong to this species. It feeds upon fishes of various kinds, and swallows vast numbers of them, six hundred cod-fish having been found in the stomach of a rorqual, together with many smaller fishes. It may be known from the Greenland whale by the presence of a dorsal fin. (*See* Whales.)

Rose-Beetle, (*Cetonia aurata*,) a common coleopterous insect, about three-quarters of an inch in length, and of a bright green, and sometimes copper-like colour, with two white irregular fasciæ towards the latter part of the elytra, and extending from the side inwards. It feeds upon rotten timber when in its larva state, and is frequently found in ants' nests, where it seems to feed on the pieces of wood of which they are composed. As a perfect insect, it is seen very commonly in the south of England flying about in the sunshine in the months of May and June, frequently settling on roses, the petals of which it greedily devours. It always prefers the white variety of the rose, and in some seasons hardly a flower will be without a rose-beetle deeply buried in the centre.

Rotatoria, *ro-tă-to'-re-ă*, (Lat. *rota*, a wheel,) a fam. of the *Infusoria*, which has the mouth surrounded by a corona of vibratile hairs, which represent a kind of wheel. (*See* Rotifera.)

Rotifera, *ro-tif'-e-ră*, (Lat. *rota*, a wheel; *fero*, I bear,) wheel-animalcules, a class of animals placed by Ehrenberg among the *Infusoria*, under the name of *Rotatoria*. They have acquired these names on account of the apparent rotation of the wheel-like organs which surround their mouths, and which are covered by cilia. The appearance of rotation is, however, an optical deception, and is caused by the movement of the cilia, just as waves seem to ripple over a field of ripe corn when the wind blows. They are extremely minute, but some of the larger forms can be seen with the naked eye. Their existence, however, was first discovered by Leeuwenhoek. He first gave a description of their structure and habits in the "Philosophical Transactions" for 1702. The *Rotifera* are very widely diffused on the surface of the earth. They inhabit both salt and fresh waters, and are found in the cold, temperate, and tropical parts of the earth. Although capable of swimming freely, they are generally found near or attached to the leaves of plants. They have no true circulating or respiratory organs, though in most of the species minute vessels can be seen which terminate in blind sacs or cæca.

Rouget. (*See* Harvest-bug.)

Roussette. (*See* Flying Fox.)

Rove-Beetles. (*See* Staphylinidæ.)

Rudder-fish, *rud-dur*, a pretty little fish, (*Caraux carangus*.) It derives its name from its habit of following ships and large boats for the sake of eating the refuse that may be thrown overboard. Its colour is silver white diversified with blue.

Ruff, *ruf*, a British bird allied to the Plovers, and remarkable for its gamesome habits. During the breeding season the cock-birds fight desperately for the possession of the females, and are so absorbed in combat that they can be picked up by hand or captured in a net. The ruff derives its name from a singular development of the rich feathers which, in the adult male bird, are capable of being spread like a Queen Elizabeth ruff about the head and neck. The females and immature males do not possess the ruff, and even the old males only assume it in June and lose it by September. The ruff is considered a great dainty, and is regularly fattened for the table, being left in darkness to prevent it from fighting. Under this regimen, having plenty to eat and nothing to do, it becomes a perfect ball of fat, and is then highly valued. The female is called the Reeve. Its scientific name is *Philomachus pugnax*.

Ruminants, *ru'-me-nănts*, (Lat. *ruminantia*,) the name given by Cuvier to his eighth order of *mammiferes*, indicating the single faculty possessed by the animals belonging to it of masticating a second time their food, which they return into the mouth after a previous deglutition, a power which is the result of the structure of their stomachs, of which they always have four. The animals belonging to this order have nearly all the air of being constructed on the same model, the camels alone presenting some small exceptions to the common character. The first of these characters, according to Cuvier, is the possession of incisor teeth in the lower jaw only, these being nearly always eight in number, and replaced above by a callous rim. Between the incisors and the molars is a wide space, where are found, in one or two genera only, one or two canines. The molars, nearly always six in number, on each side of the upper and lower jaws, have their crown marked with two double crescents, the convexity of which is turned inwards in the upper and outwards in the lower teeth. The four feet are terminated by two toes and two hoofs, which oppose to each other a flattened surface, so that they have the appearance of a single hoof which has been split. The first stomach is much the largest in the adult animal, but not so in the recently-born calf or lamb. It is divided outwards into two bag-like appendages at its extremity, and it is slightly separated into four parts on the inside. The internal coat of the stomach is beset with innumerable flattened papillæ. It is very capacious, and fitted to receive a large quantity of grass or other matter on which the animal feeds; but no gastric fluid, or any other solvent fluid, enters it; and thus it is simply a receptacle From this stomach the herbage, rudely broken up by the first mastication, is transferred to the second stomach, or "kingshood," which is of a very peculiar construction. It is very muscular in its walls, and the interior of it consists of cells, which are larger or smaller, according to the size of the animal and the nature of the food upon which it habitually subsists. The walls of these cells have the faculty of standing erect, at the same time that there is a vermiform or twisting motion of the entire organ. By means of these cells and this motion the food is compressed into small balls, which are one by one returned to the mouth for remastication. During this operation the animal remains in a state of repose until all the herbage swallowed has undergone the action of the molar teeth a second time. The aliment thus remasticated is passed into the third stomach, "manyfold, or moniplies;" so called because it consists of parallel laminæ, bearing some resemblance to the leaves of a book, which lie lengthwise and vary in breadth, in regular alternate order, amounting to some forty in the sheep and about a hundred in the cow. This is the stomach in which the drink of the animal mingles with its food. From the manyfold the food and drink are combined, and reduced to a pulp, upon which the real digestive process can be exercised, are conveyed to the fourth, or truly digestive stomach of the animal, which is the only one that secretes gastric juice, and is commonly known by the name of "the red." It is next in size to the first stomach or paunch, of an elongated pyriform shape, and with an internal villous coat, similar to that of the human stomach, with large longitudinal wrinkles. Cuvier makes ruminants consist of two divisions—first, those without horns, and second, those with horns. The first division embraces the camels, the llamas, and the chevrotains; secondly, all the rest of the ruminants, of the male sex at least, have two horns or prominences, more or less long, projecting from the frontal bones.

Rupicola. (*See* Cock of the Rock.)

Rupicopra. (*See* Chamois.)

Rusa. (*See* Sambur.)

Rush, Sea. (*See* Pavonina.)

Ruticilla. (*See* Redstart.)

Rytina, *ri-ty'-na*, a gen. of herbivorous cetaceans allied to the dugong and the manatee. It is now thought to be extinct, having been destroyed by ship's crews in a very few years after its discovery. It lived in an island in Behring Straits.

S.

Sabella, *sa-bel'-lah*, a gen. of marine worms, belonging to the order Setigeræ, and having in consequence a double row of bristles along the sides. They make gelatinous tubes covered with sand;—some species are plentiful on our shores.

Sable, *sa'bel* a weasel allied to the Marten-cats (*Martes zibellina*) inhabiting northern Europe. Its fur is exceedingly valuable, and the animal is therefore much persecuted by hunters. As the fur is in the best order in winter, the hunters are obliged to undergo many hardships, and often perish in their tasks. They catch the sable in fall-traps, which cause a log of wood to fall on the animal and kill it without injuring its fur. The traps are made in circles of some ten miles in diameter, and the hunter establishes huts at regular intervals, so that he continually travels the same circle. In one spot he has a tolerable house, and keeps there his stores of provisions and other necessaries. Nearly all the sable skins that are brought to civilised countries have been obtained by trapping, but a few are caught annually in nets and snares.

Sable Antelope. (*See* Ægocerus.)

Sacrum, Os, *os sai'-krum*, (Lat., sacred bone, so called probably from being offered in sacrifices by the ancients,) in Anat., is the bone which forms the basis of the vertebral column, being articulated above by the last lumber vertebra, while laterally it is firmly united by a broad irregular surface to the ossa innominata or hip-bones, and united below to the os coccygis. In young subjects, it is composed of five or six pieces, united by cartilage, but in more advanced age it becomes one bone, in which, however, we may still easily distinguish the marks of the former separation. It is pyramidal in form, flattened before and behind, with its basis towards the lumber vertebræ, and its point terminating in the coccyx. Like the vertebræ, it presents various processes, and holes affording passage for the nerves.

Sai, *sah-ee*, a pretty little South American monkey, belonging to the genus Cebus, (*Cebus capucinus.*) The top of its head is jetty black, which contrasts boldly with the light coloured fur of the sides of the head. It is sometimes called the Weeper Monkey.

Sakis, *sah-kees*, a small group of South American monkeys belonging to several genera. The white-headed Saki, or Black Yaite, (*Pithecia lencocephala*,) remarkable for the dark fur of the body, and the white full fur on the head. The black-headed Saki, or Cacajow, *q. v.* The bearded Saki or Cuxio. (*See* Brachyurus.)

Salamander, *săl-ă-măn'-der*, (Lat.)—Any description of the few harmless reptiles which belong to the family *Salamandridæ* would be incomplete if no notice were taken of the ignorant superstitions which made them the "daughters of fire," and gave them the faculty of poisoning vegetables. It is difficult to trace the manner in which these superstitions arose; but their origin, doubtless, had some relation to the extraordinary metamorphoses which salamanders undergo. The salamanders are a genus of batrachian reptiles, having some slight resemblance to the lizards in their external shape, but very properly separated from them by more modern naturalists, since their structure came to be better understood. The general characters may be described as follows:—The body lengthened, with four feet of equal dimensions, and a long tail; the head is flat, and the ear entirely imbedded in the flesh, and without any distinct tympanum, and only a small cartilaginous plate on the opening; both jaws are furnished with numerous small teeth, and there are two parallel rows of such teeth along the bones in the upper part of the mouth, which represent the vomer; the ribs are merely rudimental, though they are not wholly wanting as in the frogs; but there is no sternum of bone; the sternum is very imperfectly developed, and suspended to the spine by ligaments; the legs are of nearly equal length, and without any webs on the toes or claws of them; and there are always four toes on the fore-feet, and generally speaking, five on the hind ones. In the adult state they breathe in the same manner as tortoises and frogs, but in their early state they breathe in the water by means of gills. Salamanders are, technically speaking, ovoviviparous; that is, when the ova or eggs have arrived at the state in which, in the other batrachia, they are wont to be expelled, in these they are retained for some time after their development. A peculiar property of the salamanders is, that when repeatedly deprived of an important portion of their body, that portion is as frequently renewed. An eye, for instance, may be extracted, and speedily a new and perfect one is found to have supplied its place. Salamanders are usually divided into land species and water species; but it must be observed that the land ones inhabit humid places, and the aquatic ones breathe air, and are not wholly confined to the water. The common newt, or eft, belongs to the salamanders. The animal of which such strange stories are told is the common salamander of Europe, (*Salamandra mamalosa*,) a pretty black creature, spotted with yellow. On the continent this animal, though perfectly harmless, is held in great dread. The popular superstition respecting its fire-resisting properties is probably owing to the fact that, like many others of its kind, it exudes a liquid from the pores of the skin, and that it might, possibly, slip through a fire without suffering much harm by means of pouring out a large supply of liquid. The most remarkable species is the gigantic salamander of Japan, (*Sie boldia maximus*,) which is, in fact, a huge newt measuring nearly a yard in length, and rather thick and fleshy in proportion to its size. It is covered with heavy mail, and it is of a brown colour. It was first brought from Japan by Dr D. Siebald, and of late years it has thrived in the Zoological Gardens, feeding on fish, and consuming great quantities of them. (*See* MENOPOME, and AXOLOTL.)

SALIVA, *să-lī′-vă*, (Lat., from *sal*, salt,) is that fluid by which the mouth and tongue are constantly moistened in their natural state, and which is supplied by glands which form it, called the salivary glands. There are three pairs of salivary glands—the parotid, the submaxillary, and the sublingual. The saliva itself has neither colour nor smell, and is tasteless; for although it contains a little salt, the nerves of the tongue are so accustomed to it, that it is imperceptible. Its specific gravity is somewhat greater than that of water, and it is supposed that about twelve pounds are secreted in twelve hours. From the mechanical pressure of the muscles upon the salivary glands, the secretion is much augmented during speaking and mastication. In hungry persons, too, it is largely secreted at the sight of agreeable food. Its uses are to augment the taste of food by the evolution of sapid matter, to mix with, dissolve, and resolve into its principles, the food during mastication, so as to change it into a pultaceous mass fit to be swallowed; to moderate thirst, by moistening the cavity of the mouth and fauces. In the healthy state, it consists of at least four-fifths of water, comprising, besides, mucilage, albumen, muriate of soda, phosphate of soda, phosphate of lime, and phosphate of ammonia.

SALMON, *săm′-on*, (Lat. *salmo*, Fr. *saumon*,) (*Salmo Salar*,) a celebrated fish, belonging to the family of the *Salmonidæ*, the generic characters of which are as follows:—Head smooth; body covered with scales; two dorsal fins, the first supported by rays, the second fleshy, without rays; teeth on the vomer, both palatine bones, and all maxillary bones; branchiostegous rays varying in number generally from ten to twelve, but sometimes unequal on the two sides of the head of the same fish. The general length of the salmon is from two and a half to three feet, but sometimes much more; the male is principally distinguished by the curvature of the jaws; both the lower and upper mandible bending towards each other more or less in different individuals and at different seasons. The general colour of both sexes is a silvery-gray, of a much darker cast on the back; the sides of the male are marked with numerous small, irregular, dusky and copper-coloured spots; while those of the female exhibit only several rather large, distant, roundish, or somewhat lunated spots, of a dark colour. Besides these differences, the male is of a somewhat longer or more slender shape than the female. The scales in the salmon are middle-sized, and not very strongly adherent. The salmon is a fish of great elegance, combining a form fitted alike for strength and swiftness, and occupies a foremost place in the estimation of both sportsman and epicure; its pink-coloured flesh being regarded by the latter as a great delicacy, in spite of its being somewhat indigestible. The salmon inhabits the seas around Great Britain, and extends to the north of Europe and Asia. It enters the rivers sooner or later in the spring or summer months to spawn, but generally delays entering them until the streams become somewhat swollen by rains. When this has occurred, they enter them usually in large bodies, swimming in the middle of the stream, and near the surface, and seldom resting in their course as long as the water remains discoloured. In the first part of their course, they are easily frightened, either by a sudden noise or floating timber, and on such occasions frequently turn aside and return to the sea. When farther advanced, however, they make the most determined efforts to surmount rapids and cascades, and will leap a fall of twelve or fifteen feet in perpendicular height. If they fail in their attempt and fall back into the stream, it is only to remain a short time quiescent, and thus recruit their strength to enable them to make new efforts. In some rivers the fall is so great that very few salmon are able to project themselves to such a height, and in some rivers an ingenious arrangement called "salmon stairs" has been made, by means of which the fish are able to leap a succession of short falls, instead of being obliged to surmount one high fall. The fish having at length gained the upper and shallow pools of the river, preparatory to the important operation of depositing the spawn in the gravelly beds, its colour will be found to have undergone considerable alteration during the residence in fresh water. As the process of milting and roeing advances, extreme pressure appears to injure the vital functions; the animal oil and all interstitial matter are absorbed, and the fish becomes thence lean in flesh, and what remains is not only in a great measure colourless and insipid, but frequently unwholesome also. The male becomes marked on the cheeks with orange-coloured stripes; the lower jaw elongates, a cartilaginous projection turning upwards from the point; the body receives a golden-orange tinge, and the fish in this state is called a *red fish.* The female seems to suffer even more than the male, and as it turns dark in colour, is frequently termed a black fish. The manner in which salmon deposit their spawn is as follows. A pair of fish make a furrow by working up the gravel with their noses rather against the stream, as a salmon cannot work with his head down the stream; for the water then going into his gills the wrong way, drowns him. When the furrow is made, the male and female retire to a little distance, one to the one side, and the other to the other side of the furrow; they then throw themselves on their sides, again come together, and rubbing against each other, both shed their spawn into the furrow at the same time. This process is not completed at once; it requires from eight to twelve days for them to deposit all their spawn; and when they have done, they betake themselves to the pools to recruit themselves. They finally redescend to the sea by easy stages, where their former condition and silvery lustre are soon regained, and their strength invigorated. The ova continue covered by the gravel during the winter, and begin to vivify from about the end of March to the commencement of April. The fry remove from under the gravel when about an inch in length with the ovum still attached, the head and eyes large, and the colour of the body pale brown, with nine or ten dusky gray marks across the sides. The young salmon fry, or parr, as it is called as long as it retains the brown marks on its sides, may remain a whole year in the fresh water. On the eve of descending to the sea, it assumes a more brilliant dress, and becomes a smolt. At this time it is from four to six inches in length, of a greenish-gray above, silvery below, the scales extremely delicate and very deciduous. From the time the smolts reach the sea, for two months or ten weeks we lose sight of them, and can only infer their growth from the fact that after the lapse of that period we find them again ascending the rivers, with a weight of from two and a half to four pounds. They are then known under the name of *gilse* or *grilse;* and their size, as they ascend from the sea, increases with the advance of the season. The grilse, which thus ascend, spawn during the ensuing winter, and are then entitled to the name of salmon. Descending in a weak state, they return in the following summer some ten or fifteen pounds in weight. The size of grilse or salmon does not depend on age, but on capacity for growth, or the length of time they remain at sea, and on the quantity and quality of the food they find there. There are rivers in which salmon never attain the weight of ten pounds; others in which grilse are often of that weight, and salmon of the weight of fifty pounds. The whole developments of the salmon, from the egg to the adult fish, has of late years been carefully studied by means of the various salmon hatching establishments which have been erected; and by their means the long-disputed point as to the real character of the parr has been set at rest. That the food sought for to produce and sustain the rapid growth in size of the salmon must be very considerable in quantity, as well as most nutritious in quality, cannot be doubted; whilst the fact that the salmon is a voracious feeder, may equally be inferred from the degree of perfection in the arrangement of its teeth, and from its own habits; and yet, strange to say, of the many observers who have examined the stomach of the salmon to ascertain the exact nature of that food which must constitute their principal support, few have been able to satisfy themselves. At sea they are taken with small fish and sand-eels within them; but in our rivers they are seldom observed to have anything within their stomachs but mucus, a peculiarity which probably arises from their having, like herrings, a very quick digestion, and from their taking in their food in very small quantities at a time, and thus leaving the stomach in a constant state of capacity or fitness for immediate digestion. The regulation of salmon-fisheries has, during many centuries, been in this country the subject of much coutroversy, legislation, and litigation. It forms a prominent clause in Magna Charta; was legislated for by Edward I. of England, and by Robert the Bruce in Scotland; has never since been allowed to rest, and during the last fifty years has been stirred up almost perpetually by commissions, committees, or bills; and has almost perpetually been before the law courts in one shape or another. It is, in fact, a very valuable fish, fetching a considerably higher price, pound for pound, than any kind of butcher's meat; and as it consumes nothing of value to men, is, to use Franklin's phrase, a bit of silver pulled out of the water. In former times salmon were very plentiful, both in Scotland and England; they were in large request, as salted fish, for the religious houses during the winter; and in Rymer's *Fœdera* we have an order given by Edward II. to provide 3000 dried salmon for the sustenance of his men. But in recent times the supply has much decreased, from, it is supposed, the following causes:—In the first case, the increase of land drainage, especially of the old sheep-drains of the pastoral districts, is supposed to have proved injurious, by bringing the surface-water more rapidly, and in greater volume, into the river, and hastening its descent into the sea. Salmon prefer travelling upwards when the water is full, but by no means clayey; and the increase of land-drainage not only has a strong tendency to keep it in the latter state, but also, by the production of sudden floods, to alter the character and structure of the spawning-beds, by shifting the gravel. Many of the more lowland streams, again, are deteriorated in their nature by the increase of human settlements along their banks, and the consequent increase of various manufacturing works, the operations of which produce refuse abhorrent to the tastes of salmon. Another alleged cause of decrease is the killing of spawning fish in close time; but although it is admitted by all interested in the subject that this is a great evil, it is argued, on the other hand, that this cannot be a cause of the decrease, as diligent inquiries have corroborated the opinion that this practice is not new and increasing, but old and decreasing. Another cause alleged for the decrease has been the *brevity or mistiming of the close season*, and *over-fishing*. As, however, acts have recently passed—for England in 1861, and for Scotland in 1862—to remedy the more glaring evils complained of in these respects, it is scarcely necessary at present to discuss the subject.

SALPA, *sa'l-pah*, a remarkable gen. of molluscoids, that are produced in alternate and dissimilar forms. The chained salpæ are affixed to each other in long strings, so that the whole mass proceeds through the water in unison. These, however, produce free salpæ, which are not all like their parents, and enjoy independent locomotion. Their offspring, however, are not free salpæ, like themselves, but chained salpæ like their parents.

SAMBUR, *sam'-boor*, a splendid Indian deer, (*Rusa Aristotelis*,) that exceeds our red deer in size. It is generally found in the lowlands, especially where the ground is intersected with water-courses. Hunters set great value on the animal, not so much for the value of its hide, horns, or flesh, as for the sport which it affords. It is sometimes called Samboo.

SANDHOPPER, *sand-hop-per*, a curious little crustacean, belonging to the sessile-eyed crustaceæ, and the fam. Orchestidæ. It is very plentiful on sandy coasts, and may be seen leaping about merrily as the tide ebbs or flows. Its scientific name is *Talibrus saltator*.

SANDPIPERS, *sand-pi'-pers*, a group of birds belonging to the fam. Scolopucidæ, many of which are very plentiful on our coasts. The most common are the green sandpiper, (*Totanus octaopus*,) and the summer snipe, or common sandpiper, (*Tringoides hypoleuca*.) As their name implies, the sandpipers are often seen on sandy shores, though they are also fond of frequenting salt marshes, where they find abundance of food. The summer snipe is so called because it somewhat resembles the jack-snipe in form, and is only seen in this country from April to October.

SANDSCREW, *sand-skroo*, a sessile-eyed crustaceæ allied to the sandpiper, but remarkable for burrowing its way into the sand just below the surface, looking as it were being screwed along, (*Sulcater arenarius*.) As it wriggles its way upon the sand, it leaves a tortuous track, as if a worm had passed over it.

SAPAJOUS, *săp'-ă-jooz*, a name given to many of those South American monkeys which have prehensile tails.

SARCORHAMPHUS. (*See* CONDOR.)

SAREOTHERA. (*See* RAIN-BIRD.)

SARTORIUS, *sar-to'-re-us*, (Lat. *sartor*, a tailor,) in Anat., is a flat and tender muscle, but the longest of the human body, extending obliquely from the upper and anterior part of the thigh to the upper anterior and inner part of the tibia. It serves to bend the leg obliquely inwards, or to roll the thigh outwards, and at the same time to bring one leg across the other; on which account it has received the name of *sartorius*, or tailor's muscle.

SASIN, *sa'-sin*, popular name for the common Indian antelope. (*See* ANTELOPES.)

SASSABY, *sa's-sa-bi*, a handsome antelope of South Africa, (*Damalis lunatus*.) It is one of those antelopes which cannot exist without water, so that its presence is always a sign to the hunter that water is near. It is found in small herds or families.

SAVANNAH BLACKBIRD. (*See* CROTOPHAGA.)

SAW-FISH, *saw-fish*, a remarkable fish allied to the rays and skates, and plentiful in the warmer seas, (*Pristis antiquarium*.) It derives its name from the wonderful structure of the snout; it projects for many feet, and is wide and flattened. On either edge there is a row of sharp teeth, so that the snout bears no small resemblance to a saw with teeth on each edge. This remarkable weapon is used in catching prey. The saw-fish feeds upon other fish, but owing to the position of its mouth, which is placed under the head, as is the case with all the skates, it is unable to catch the fish in fair chase, and has recourse to stratagem. Dashing into a shoal of fish, this creature strikes right and left with its armed snout, cutting and wounding in every direction, and then picks up the disabled fishes at its leisure. Several species of saw-fish are known.

SAXICOLA. (*See* WHEATEAR.)

SCAD. (*See* MACHERAL HORSE.)

SCALE INSECTS, *skail*, insects belonging to the Coccidæ, and sometimes called mealy bugs. They are very injurious to flowers and trees, especially apple-trees.

SCALOPS. (*See* MOLES.)

SCALEOP. (*See* ESCALLOP.

SCANSORES, *skan-saw-rees*, a large group of birds, in which the four toes of the feet are arranged two in front and two behind, so as to afford a firm grasp. The toucans, parrots, woodpeckers, &c., belong to this group.

SCAPULA, *scăp'-u-lă*, (Lat., the shoulder-blade,) in Anat., is the name given to that flat triangular bone passing from the shoulder-joint in a direction towards the vertebral column, and extending, when the arms hang loosely, from the first to about the seventh rib. It presents various irregularities, and is so thin in some places as to be transparent. The outer surface is slightly convex, and divided into two unequal parts by a very prominent ridge or plate of bone, termed the "spine." The use of this bone is to afford a movable fulcrum for the motions of the arm, as well as an extensive surface for the attachment of the muscles which affect the movement.

SCARABÆIDÆ, *skăr-a-be'-e-de*, a large family of pentamerous *Coleoptera*, belonging to the group *Lamellicornes*. They possess antennæ, generally terminated by a club, made up of leaflets, capable of being shut up, but sometimes of box-like joints. The species are about 3000, and this immense group has been subdivided into several distinct families. The

Coprophagi, or dung-feeding beetles. The type of this family is the sacred beetle of the Egyptians. (*See* Ateuchus.) The second family, the *Arenicoli*, contains those specimens in which the elytra entirely cover the abdomen. They make deep burrows in the earth, fly about after sunset, and counterfeit death when alarmed.—The third family is that of the *Xylophili*, the males of which have peculiar horns or tubercles on the head or thorax.—The fourth family, *Phyllophagi*, contains a number of beetles, called chafers, which feed on the leaves of trees.—The fifth family, *Anthobiæ*, contains species which feed upon leaves and flowers.—The sixth family, *Meletophili*, are also beetles which live upon the juices of flowers.

Scarf-skin. (*See* Skin.)

Scarus. (*See* Parrot-fish.)

Scheltopusic, *shel-toe-pew-sik*, a remarkable legless lizard (*Pseudopus Pullosii*) which inhabits Northern Africa. It so closely resembles a snake that it is usually mistaken for one of those reptiles.

Scissor-bill, *sis-sor*, a curious gull found on some of the American and African coasts, (*Phyncopsuigra.*) The beak is so flattened that, when open, it much resembles a pair of scissors, and the lower mandible is larger than the upper, into which it shuts. The bird flies along the surface of the sea, ploughing the water with the lower mandible, and thus picking up its food.

Scolopacidæ. (*See* Snipes.)

Scolopeudra, *skol-o-pe'u-dra*, a gen. of myriapoda, popularly known as centipedes. In England they never attain great size, and are harmless to mankind, but in tropical countries they are eight or ten inches long, as thick as a man's finger, and possess a pair of venomous claws which are as dangerous as the fangs of the viper.

Scomber. (*See* Macharel.)

Scopophorus. (*See* Ousebi.)

Scops. (*See* Crane.)

Scorpion, *skor'-pe-on*, (Lat. *scorpio*,) a formidable creature allied to the spider, but differing greatly in form, being distinguished from it by having the abdomen articulated with a curved spur at the extremity, under the point of which are two small orifices, which serve to give passage to a poisonous fluid. The anterior pair of feet or palpi are very large, resembling those of the lobster in form. The other feet do not differ essentially in form from those of spiders. On the under side of the thorax are two comb-like appendages, the use of which is not well understood. Scorpions inhabit the hot countries of both hemispheres, live on the ground, conceal themselves under stones and other bodies, and not unfrequently taking up their abode in houses. When disturbed, they run rapidly with the tail over the back, ready to turn it in any direction, either for attack or defence. They feed on insects and their eggs. The species of the south of Europe are little more than an inch in length, whilst some of the tropical species exceed five inches; and the sting of the latter produces serious symptoms, which are said frequently to result in death. The young scorpions are produced at various intervals, and are carried for several days upon the back of the parent, during which time she never leaves her retreat. The genus is divided by naturalists into sub-genera, depending upon the number of the creature's eyes, whether six or eight.

Scorpion, Water, a popular name for a heteropterous insect, scientifically named *Nepa cinerea.* All the insects of this genus are very flat, and, with their claw-like forelegs, really look very like flattened scorpions. They live mostly in fresh water, but are able to fly, having wide wings packed under their flat rhytia. They are fierce and voracious insects, and feed upon other insects, seizing them in their fore-legs, and sucking their juices with the sharp proboscis with which they are furnished. The females have a long, pointed ovipositor, which increases their resemblance to the scorpion. The common English species is only an inch in length, exclusive of the ovipositor, but some of the exotic species are four times that length, and, if held in the hand, can inflict very painful wounds with the proboscis. Even our own species can drive its proboscis deeply into the human skin.

Screamers, *skreem-ers*, birds belonging to the fam. Palamedeidæ, and natives of South America. They derive their name from the startling loudness of their cry. One species, the horned screamer, (*Palamedea cornuta*,) has a long slender horn, which projects from its forehead, the use of which is unknown. Another species, the crested screamer, (*Chauna chavaria*,) is nearly as remarkable for the feathery crest upon its head. Both birds are armed with short and strong spurs upon the wing, with which they can strike severe blows.

Sculpin, *skul-pin*, a little fish, (*Callionymus lyra*,) sometimes called the Dragmet, or Gourdie. The first dorsal ray is very long, equalling two-thirds of the body, and the pectorals are rounded.

Scythrops. (*See* Channel Bill.)

Seal, (*Phoca*,) a gen. of the fam. of marine carnivorous mammalia named *Phocidæ*. The genus *Phoca* comprises a great amount and a considerable diversity of species. Their feet are so short and so encompassed in the skin, as to render their terrestrial movements very awkward, and their terrestrial motion is effected by a sort of shuffling, jumping motion, in which the spine and the muscles of the body are principally employed, though the extremities are used in getting, or rather climbing, out of the water upon a rock or other projecting body; but as the intervals of their toes are filled by membranes admirably adapted for swimming, their swimming powers are nearly inexhaustible, and they pass the greater portion of their lives in the water. The form of the body is elongated, the spine extremely flexible, the muscles very powerful, and the fur close and short. Considered as regards their structure, their principal place of abode, and their motions, they hold a place between the land mammalia and the cetacea, or whales. They have all the three kinds of teeth, and in this particular resemble the land carnivora, and there is little doubt that the chief food of most species is fish, caught alive in the water, an operation in which they are very expert. The head is round, and the nose, which is broad, is like that of a dog, with the same look of intelligence and mild expressive physiognomy. It has large whiskers, oblong nostrils, and black sparkling eyes. The arms and fore-arms of the seal are very short, and wholly concealed under the skin of the shoulder and breast; the fingers, as already said, being united by a membrane into a sort of paw or paddle. The hind-legs are still more concealed, and have less of independent motion than the fore ones; but the toes are more webbed, and they are altogether more efficient in swimming. The brain of the seal is well developed, and the degree of sagacity and attachment which they show in domestication is evidence of superior intelligence. Seals have the power of opening or closing their nostrils at pleasure, and the interval between their respirations is very long; the closing being effected by sphincter-like muscles acting upon valvules, which close the aperture most effectually. The auditory nerve is very large, and though the auricular opening is closed by a mechanism somewhat similar to that which shuts the nostrils, it is evident that seals hear very well even under water. The members of the seal family are amongst the most numerous of all mammalia that attain anything like an equal size. On some parts of the British coasts they are plentiful, especially on the more northern ones; but in other places they literally swarm. Estuaries and straits are their favourite grounds, evidently because the fishes, which are more dispersed in the open seas, congregate in greater numbers in the currents of these narrow places. They are excellent swimmers and ready divers. Their heads in swimming are always above the water, in the manner of that of a dog. They have their dens or lodgments in hollow rocks or caverns near the sea, but out of the reach of the tide. They sleep and bask on rocks surrounded by the sea, or on the less accessible parts of cliffs left dry by the ebb of the tide, and, if disturbed by anything, at once make for the water; and they are said to be so watchful and wary that they never sleep for more than a minute or two at a time, frequently raising up their heads to see if there is any chance of danger. The *common seal*, (*Calocephalus* or *Phoca vitulinus*,) the typical one of the genus, is found upon the shores of all the colder places in Europe. It is usually about five or six feet in length. The ground-colour of the hair or skin, when the animal is alive and dry, is pale whitish-gray, with a very slight tinge of yellow; when just out of the water and wet, it is ash-colour. After death, and as seen in museums, the ground-colour is pale yellowish-gray; the oil having penetrated the skin and rendered the hair of a more yellow hue. The body above is clouded and marbled with blackish-gray. Space round the eyes and muzzle, sides of the body, and all the lower parts and the feet, pale grayish, becoming nearly white beneath. There is some brown on the muzzle and upper part of the tail; whiskers moderate, undulated; claws black and rather strong; length from three to five feet. It inhabits the northern seas generally, the coasts of England, France, &c. It is comparatively scarce on the southern coasts of Britain now, but still haunts the estuary of the Tees, where it is still captured for the sake of its skin and the oil its fat yields.—The *Harp seal* or *Atak* (*Calocephalus grœnlandicus*) has hair that is drier, closer to the leather, and more free from wool than that of the other species; each hair flat and lustrous. It derives its name from a harp-like black streak, which extends over the shoulders and down each side of the body. This species is very numerous in the deep bays and the mouths of the rivers in Greenland, where they live in vast herds among the floating ice-islands, among which they are sometimes seen swimming in great numbers, under the guidance of one who seems to act as leader and sentinel for the whole. Their food consists of all kinds of fish, shell-fish included. To the Greenlander they are all in all, giving him light, food, and clothing. He goes to hunt the animal in his canoe, which is in the form of a weaver's shuttle. When he perceives a seal, he endeavours to surprise it unawares, with the wind and sun at his back, that he may be neither heard nor seen. He approaches it rapidly, but silently, till within three or four fathoms. He then takes hold of the oar in his left hand, and with his right throws the harpoon. If it is fixed, the Greenlander throws the attached buoy overboard on the same side that the seal dives, and he dives upon the instant. The struck victim often carries the buoy under water; but, wearied and wounded, it must at last come up to breathe. The hunter, who is on the watch, now attacks it with his long lance, till the animal is exhausted, when he releases it from its sufferings with his short lance. The seals belonging to the sub-genus *Stenorhynchus* are distinguished by the great elongation and the slenderness of the muzzle, which is the foundation of the name. The claws on the toes are very small, and altogether they have a much more aquatic air about them than the common seal. They are found about the Falkland Islands and New Georgia; but of their natural history little or nothing seems to be known. The seals belonging to the subdivision *Pelagius* have the muzzle elongated, but very much enlarged towards the extremity; and the claws on the hind-feet are sometimes altogether wanting. One of the species, *Pelagius monachus*, the monk-seal, a native of the Adriatic and the coasts of Sardinia, is supposed to be that whose skin was always carried everywhere by the Emperor Augustus, as a protection against lightning, in accordance with a general Roman superstition. The seals belonging to the subdivision *Stemmatopus* consist of only one species, the crested seal, *Stemmatopus cristatus*, which has the head surmounted by a peculiar organ, which is erectible at the pleasure of the animal, and the use of which is not known. It is in fact a development of the septum or gristly division of the nose. This curious growth is peculiar to the adult male, neither the young male nor the female possessing it. This species, which is about eight feet long, is found on the coasts of Greenland and of North America, down to the United States. Its bite is formidable, and its voice is said to resemble the bark and whine of a dog. It is one of the species most generally pursued, and together with the rough seal, *Calocephalus hispidus*, furnishes the greatest number of the seal-skins brought to Great Britain. The seals belonging to the subdivision *Macrorhinus* differ widely from those belonging to the other subdivisions. The *Macrorhinus proboscideus*, or elephant seal, or sea elephant, which belongs to this subdivision, is remarkable for the nose of the male being prolonged into a kind of proboscis, which hangs down when the animal is quiet, but when it is angered, the snout is stretched out, and the seal blows so violently through it as to make a loud roaring sound. This seal, which is enormous when compared with the ordinary seal, as it sometimes attains a length of twenty-five feet and upwards, is found in the southern hemisphere, both in the Atlantic and Southern oceans, South Georgia, Juan Fernandez, South Shetland, and the Falklands. It is fond of wallowing in fresh-water swamps, and resorts to rivers and lakes, whose waters it drinks with apparent pleasure. The cry of the female and young is said to resemble the lowing of an ox, whilst the voice of the male is described as being a hoarse gurgling sound, which is heard to a great distance, and is wild and frightful. They are a harmless race, never attacking man unless in defence of themselves and their young, and readily tamed by kind treatment. Their tongues, when salted, are considered savoury and wholesome, but the flesh is black, oily, and indigestible. The skin, though not valued for its fur, is extensively used for carriage and horse harness, on account of its great strength, but its oil is the great object for which the animal is hunted. It associates in flocks, each consisting of one male and a number of females. During the summer it becomes more gregarious, and may be found in vast herds. There are also two more species which remain to be noticed,—one named the *Sea Bear*, the other the *Sea Lion*.

Sea Bear, The, or Ursine Seal, (*Arctocephalus ursinus*,) is about eight feet in length, but, although small, is peculiarly valuable, as it furnishes the fur which is so well known as seal-skin. It is found on the shores of Kamschatka. The Sea Lion (*Otaria jubata*) is remarkable for the thick mass of curly hair which decorates the neck and shoulders, like the mane of the lion. Only the adult male possesses this mane. It is a large animal, reaching the length of fourteen or fifteen feet. It is found in the same locality as the sea-bear.

Sea Mat. (*See* Flustia.)

Sea Mouse, *sea'-mowse*, (*Halithœa aculeata*.)—This animal, which belongs to the division of animals named *Annelida*, (*see* Annelida,) is very beautiful, and most richly coloured It is oval, six or eight inches long, and two or three inches wide. The scales of the back are covered and hidden by a kind of flocky down, which springs from the sides, and from which issue groups of strong spines, that pierce in part the flocky covering, and bundles of flexuous bristles, glittering like gold, and changing into all the colours of the rainbow. Lower down is a tubercle, out of which come spines in three groups, and of three different sizes, and finally a fleshy cone. There are forty of these tubercles on each side, and between the first two are two small fleshy tentacles.

Sea Perch. (*See* Basse.)

Sea Pie. (*See* Oyster-Catcher.)

Sea Serpent, a term applied to a huge animal like a serpent, which is supposed to inhabit the sea. The appearance of a huge monster of this kind has been frequently reported by creditable persons in late years; but in general the sea serpent is looked upon as a fabulous animal. (*See* Kraken.)

Secretary Bird, *se'k-re-tai-ry*, a large falcon of South Africa, with very long legs, and a remarkable tuft of feathers on each side of its head, like pens behind a clerk's ear, (*Serpentarius secretarius*.) It feeds upon reptiles and batrachians, and is most useful in destroying snakes, which it does with unfailing success, whether they be venomous or harmless. When it finds a snake it at once attacks the reptile, and no sooner does the serpent aim a stroke than it is knocked down by the wing of the secretary bird. Again and again is the blow repeated, until the snake is stunned, when a well-directed blow from the beak splits the snake's head, and renders the victory complete. A fine is rightly imposed on any one who kills so useful a bird.

Secretion, *se-kre'-shun*, (Lat. *secretio*,) in Physiol., is that process by which materials are separated from the blood, and from the organs in which they are formed, for the purpose either of serving some ulterior office in the animal economy or of being discharged from the body as excrement. Secretion is one of the natural functions of the living body, and is as necessary to health as nutrition. Where the secreted materials have some ulterior purpose to serve, they are known as secretions; where they are discharged from the body, excretions. Most of the secretions seem to consist of substances not pre-existing in the same form in the blood, but requiring special organs and a process of elaboration for their formation. Excretions, on the other hand, commonly or chiefly consist of substances existing ready formed in the blood, and are merely extracted therefrom. In general, however, the structure of the parts engaged in eliminating excretions is as complex as that of the parts concerned in the formation of secretions. The secretions may be arranged into three sorts: (1.) exhalations, (2.) follicular secretions, and (3.) glandular secretions. The exhalations take place as well within the body as at the skin, or in the mucous membranes, and are thus divided into external and internal. The follicles are divided into mucous and cutaneous, and into simple and compound. In almost all the points of the skin little openings exist which are the orifices of small hollow organs with membranous sides, generally filled with an albuminous and fatty matter. The consistence, colour, odour, &c., are variable, according to the different parts of the body, and which is continually spread upon the surface of the skin, rendering it less impervious to moisture, &c. The small organs are called the follicles of the skin. The glands, however, are the principal organs to which the office of secreting is more especially ascribed, and the number of them is considerable. The glandular secretions are of seven different sorts; namely, the tears, saliva, bile, pancreatic fluid, urine, semen, and milk.

Sepia. (*See* Cattle.)

Seps, *seps*, a singular lizard, sometimes called the Ciciqua in which the limbs are reduced to very minute dimensions, and are practically useless for locomotion.

Serpentarius. (*See* Secretary Bird.)

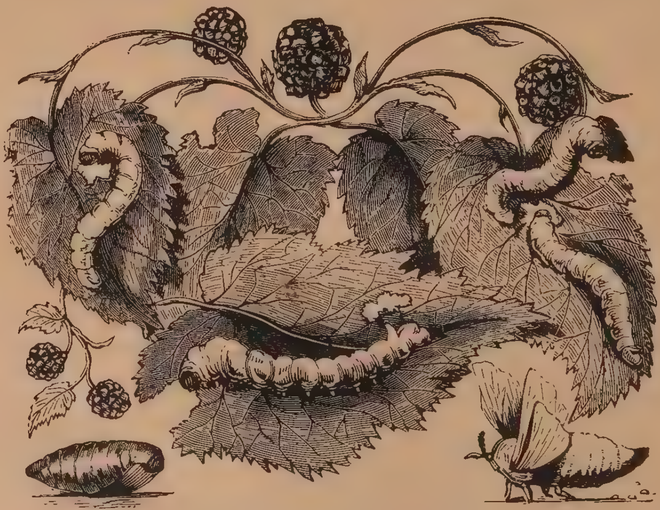
Serpents, *ser'-pents*, (Lat. *serpens*, creeping.) The third order of reptiles, of Cuvier, is thus named; and as they are without feet, they are more deserving of the name of reptiles than any other order. The general form of a serpent consists of a head, a body, and a tail, in one

SKATE

SKYLARK

SKYE TERRIER.

SLOTH



SILKWORMS, CHRYSALIS, AND MOTH

lengthened bone, without any extremities, though there are sometimes membranes to the head or neck, which admit of being spread at the pleasure of the animal. The skeleton is simple in them, consisting chiefly of the skull, the spinal column, and the bones of the head. The skull is small, and the brain is also small, and very imperfectly developed, a fact which renders naturalists averse to the idea that the serpent is a good emblem of cunning or wisdom. The mouth is in every case merely a prehensile instrument, and not a killing or even wounding one; for although the stroke of the poison-fang of a serpent is often of the most deadly character, it is only so through the poison which it discharges. The teeth of serpents are adapted for piercing and holding, but not for dividing or bruising; and consequently the animals belonging to this order swallow their prey whole; the jaws of serpents being united by ligaments, a conformation which gives them the power of dilating their jaws to such an extent as to swallow bodies larger than themselves, the bones separating to a considerable distance, and returning to their places by the elasticity of the ligaments. Serpents are divided into venomous and non-venomous; and the former are divided again into venomous with many maxillary teeth, and venomous with isolated fangs. In the non-venomous, the branches of the upper jaws are furnished throughout their length, as well as those of the lower jaw and of the palatine branches, with fixed teeth, which are not pierced. The venomous serpents with isolated fangs present a very peculiar structure in their organs of manducation. Their superior maxillary bones are very small, carried on a long pedicle, analogous to the external pterygoid apophysis of the spheroid bone, and very movable. Here is fixed a pointed tooth, pierced with a small canal, which gives issue to a liquor secreted by a considerable gland situated under the eye. It is this liquor which, when shed into the wound made by the bite of the serpent, produces effects more or less fatal, according to the species which has inflicted the wound. The fang is concealed in a fold of the gum when the serpent does not wish to use it; and there are behind it many germs of new fangs, destined to fix themselves in their turn, in order to replace it if it should be broken in the wound it makes. In the non-venomous, the branches of the upper jaw are furnished throughout their length, as well as those of the lower jaw and the palatine branches, with fixed teeth which are not pierced; there are, therefore, four nearly equal rows of these teeth in the upper part of the mouth, and two in the lower. All the venomous species bring forth their young alive, in consequence of the egg being hatched internally before it is laid: whence their general name of vipers, a contraction of vivipares. The venomous serpents with many maxillary teeth have the jaws organised and armed nearly as in the non-venomous; but the species have the first of their maxillary teeth greater than the others, and pierced so as to conduct the venom in the same manner as is effected in the venomous serpents with isolated fangs. The serpents, with one exception, (the *Deirodon*, which feeds on the eggs of birds,) subsist on living prey, and, whether venomous or non-venomous, have their teeth, as might be expected, admirably constructed and arranged for the purpose of securing their prey and assisting in deglutition. The trachea of the serpents is very long, their heart situated very far backwards; and the greater number have only one very long lung, with the vestige of a second. The tongue has great powers of mobility and extension, and terminates in two cartilaginous points. The skin in different genera is annulated, coriaceous, or granulated, or most frequently covered with scales. The powers of digestion are so slow that one meal, in many cases, serves for weeks, or even for months. The structure of the vertebral column of the serpents is different from that of any other animal; the most perfect specimens being found in the great crushing serpents, which kill their prey by compressing it in their folds, and so constructed as to give them the fullest latitude of action. The shell of the egg in the oviparous serpents is soft, like the eggs of the common hen when she has not enough calcareous aliment, are often more than thirty in number, and are connected by a sort of viscous matter, which coagulates and joins them in a kind of chain. The surface of the brain of serpents is nearly smooth and without sinuosities or circumvolutions. Their organs of touch, taste, smell, and hearing appear to be dull, if not defective, whilst that of sight is sufficiently acute. Serpents can creep, glide, grasp, suspend themselves, erect themselves, leap, dart, bound, swim, and dive. Cold latitudes do not agree with them; it is in warm climates that their numbers, their venom, and their volume attain their maximum.

Serpula, *ser'-pew-lah*, a beautiful marine annetid that makes calcareous tubes wherein it dwells. The name is now very familiar to those who care for natural history, as it is very common in marine aquaria. It is remarkable for the long scarlet gill-jaws which it protrudes from the tube, and also for the conical stopper wherewith the mouth of the tube can be closed. This stopper is a development of an antenna.

Serrasalums. (*See* Pirai.)

Sertularia, *ser-tew-la'-ri-ah*, a gen. of compound hydroid zoophytes, in which the seeds are set on the branches in vesicles which do not break away when the animal is adult. They are very plentiful on our coasts and in the mouths of rivers.

Serval, *sir-val*, a pretty South African animal allied to the leopard, (*Leopardus serval.*) The Dutch colonists called it Bosch-katte. It is one of the animals called by furriers tiger-cat. The colour of its fur is yellowish gray, profusely decorated with oblong black spots, set in nearly regular longitudinal lines. The tail is very short and bushy.

Sessile-Eyed Crustacea, those which, like the sand-hopper and fresh-water shrimp, have the eyes placed on the head, and not set on foot-stalks.

Setter, *set'-ter*, (*Canis familiaris index,*) a mongrel dog produced by crossing, chiefly between spaniels and pointers. The principal varieties of the setter are the English and the Irish. The English setter does not differ from the pointer, but is more loosely made, so as to admit of more rapidity of motion, with less diminution of the continuance of that motion. It is equalled by few hunting-dogs in sagacity, and excelled by none in docility and personal attachment. In colour it may be met with of almost every tint and marking common to hounds and spaniels, and the colour has little to do with its qualities, although the contrary is frequently asserted. Their hair is, in general, beautifully curled. The habits of the setter and the pointer are much the same, (*see* POINTER ;) but its cheerful obedience, extreme hardihood under exertion, and quickness, render it, under certain circumstances, more valuable than the pointer to the sportsman. The hairy protection of the setter's feet enables it to go through a long day's journey over moss and moor, without injury, whereas most pointers would be knocked up. On the other hand, the setter, in most cases, requires more breaking than the pointer. As it too frequently happens that its enthusiasm leads it to forget the instructions it has received, a small sample of re-breaking is often required before the shooting practices of each season commence. The Irish setter dog is a large red dog of very commanding mien, great powers, and excellent sporting qualities.

SHAD, *shad*, a well-known fish belonging to the herring tribe, (*Alosa vulgaris*,) and called in some places the king of the herrings. Its flesh is very good.

SHAG. (*See* CORMORANT.)

SHANING, *shan-in*, a little fish belonging to the blennies, (*Blennius pholis*.) By means of its pectoral fins it is able to crawl upon land; and when the tide ebbs will often creep on the shore until it finds a crevice wherein it can hide until the tide returns.

SHARK, *shark*, (*Squalidæ*,) a fam. of cartilaginous fishes allied to the rays, but easily distinguished from them by the peculiar rhomboidal form of the latter. In the shark the form of the body is elongated, and the tail thick and fleshy. The muzzle is rounded or pointed, depressed, and projects over the mouth, which is large, and armed with several rows of compressed, sharp-edged, and sometimes serrated teeth. The nostrils are situated on the under side of the muzzle, in the form of oblique openings, which vary somewhat in figure according to the species. The fins generally consist of two dorsals, two large pectorals, two ventrals, an anal fin, and a caudal. The portion of the tail of the shark which supports the tail fin is almost always bent upwards at an obtuse angle with the body, and consists of the end of the vertebral column. The water penetrates to the gills by means of several transverse openings, which are situated on each side of the neck. The skeleton is usually cartilaginous. The skin is usually very rough, covered with a multitude of little osseous tubercles; and that of some species forms a substance called *shagreen*. The eggs of the shark are fine and large in comparison with those of bony fishes, and are enveloped in a hard, horny, semi-transparent shell, terminated at the four angles with long filaments. These are deposited by the parent shark near the shore in the winter months. The convoluted tendrils hanging to the sea-weed, or other fixed bodies, prevent the cases being washed away into deep water. The long and tender tendrils of some species are used for fishing, under the name of Indian grass. Two elongated fissures at each end allow the admission of sea-water; and the young fish ultimately escapes by an opening at the end, near which the head is situated. A curious peculiarity has been observed in the young of the sharks during a very early stage of their existence. From each of the branchial apertures branchial filaments project externally; each filament contains a single minute reflected vessel, in which the blood is then submitted to the action of the surrounding medium. The appendages are only temporary, and the blood of the fish is afterwards aërated by the true gills. Sharks are the most formidable and voracious of all fishes, pursue all other marine animals, and seem to care little whether their prey be living or dead. They often follow vessels for the sake of picking up any offal which may be thrown overboard, and man himself often becomes a victim to their voracity. The teeth of the shark are movable at the will of the animal, and are usually laid down and directed backwards, but become erect at the moment the animal is seizing its prey. They are arranged in several series, one within the other, of which the outermost row is that in use, the other rows serving to replace the foremost when injured. Their form varies much in the different species, and even those of the upper and lower jaw are often very dissimilar; but although thus variable, they most commonly exhibit modifications of a triangular form, are sharply pointed, and have the lateral edges sharp and frequently serrated. Yet terrible as these teeth are, and well as they are fitted for inflicting the most fearful lacerations, their chief action is seizing and swallowing, not killing and dividing their prey. As is the case in fishes generally, the stomach of the shark is fitted for performing the whole work of assimilation without any preparation of the food by the mouth, and if it can be obtained without a struggle, the largest prey that the shark can swallow goes to the stomach entire. Large fishes, seals, the bodies of various animals of considerable size, and even an entire human body, have been found whole in the maws of the more formidable specimens of the shark family. The sharks form several natural genera, distinguished by the presence or absence of blow-holes, or of the anal fin; by the form of the head, nose, teeth, &c.—The *Beaumaris shark*, or *Pub.agle*, (*Isurus cornubicus*,) which has some external resemblance to the porpoise.—The *Basking shark*, (*Squalus maximus*,) so called from its habit of remaining occasionally at the surface of the water almost motionless, as if enjoying the influence of the sun's rays, is one of the largest of the true fishes, and has been known to measure thirty-six feet in length. From the month of June to the commencement of winter, it is to be found on various parts of the coasts of Great Britain and Ireland, and frequently wanders from our southern coast as far to the eastward and south as the coast of France. It is said to exhibit but little of the ferocious character of the sharks in general, and to have the smallest teeth, in proportion to its size, of any of them.—The *White shark* (*S. Carchariaso*) is an inhabitant of most quarters of the globe, though preferring the warmer to the colder latitudes, and of all the species is one of the largest and most voracious.—The *Hammer-headed shark* (*Zygæna sphyrnias*) is one of the most strange in form of the whole class of fishes, its head being dilated to a great extent on each side, in the form of a double-headed hammer; the eyes, which are very large, being placed on each side. It is said to be extremely ferocious, to frequent deep water, and to measure from seven to eight feet in length. It is found in the Mediterranean, on the shores of the various countries of Europe, in the ocean, and on the coast of Brazil.—The *Blue shark* (*Carcharias glaucus*) is an inhabitant of the Mediterranean, but frequently visits several parts of our coasts, and being very bold and voracious, inflicts great injury on our fishermen, cutting their lines and nets, and sometimes passing along the whole length of a pilchard drift-net, cutting out, as with shears, the fish and the net that holds them, and swallowing both together. It is of a slender and elegant shape, and its colour, which is blue-green above and white beneath, is particularly handsome.—The *Spinous shark* (*Echinorhinus spinosus*) is so called from having the surface of the skin, both on the body and fins, more or less sprinkled with strong bony-looking spines, with large circular and flattened bases, which vary in size as well as in form, some being hooked, others quite straight, in some places disposed in clusters, in others solitary, and on the extremity of the muzzle nearly wanting.—The *Greenland shark* (*Scymnus borealis*) is a native of the northern seas, and is one of the foes of the whale, which it bites and annoys while living, and feeds on when dead. It attains a length of twelve or fifteen feet, and a circumference of six or eight. It appears almost insensible to pain, and its body, though separated into any number of parts, gives evidence of life for several hours.

SHEAT-FISH. (*See* SIBERUS.)

SHEATH-BILL, *sheeth-bill.*—A curious bird (*Chionius alba*) found in New Zealand and Australia. It is of a snowy whiteness, and is remarkable for a horny sheath which covers the base of the bill, and projects over the nostrils. It frequents the sea-side and has many of the habits of the wading birds.

SHEEP, *sheep*, (*Ovis Aries.*)—Naturalists are by no means agreed as to what was the original breed of this invaluable animal, which is, in modern farming, almost equally important for furnishing the farmer with a dressing of manure and the community at large with mutton, clothing, and other necessaries of life. Of the several varieties of wild sheep which have by naturalists been considered entitled to the distinction of being the parent stock may be mentioned,—1 The Musmon, (*O. Musimon*,) still found wild in the mountains of the larger islands of the Mediterranean and European Turkey; 2. The Argali, (*O. Ammon*,) or wild Asiatic sheep, which are the tenants of the highest mountains of central Asia, and the elevated inhospitable plains of its northern portions; 3. The Rocky Mountain sheep, (*O. montana*,) which is found on the mountains of North America; 4. The bearded sheep of Africa, (*O. tragelaphus*,) found on the high lands of Egypt and in Barbary. The leading fact in the geographical history of this genus is, that it occurs both in the new and the old world, whereas the goat tribe are naturally unknown in America. It is usually regarded by naturalists as being not only specifically but generically distinguished from the goat tribe; but some authorities, on the other hand, are inclined to believe that the generic separation is founded chiefly upon characters which have arisen from the influential power of man. In a state of nature the sheep is scarcely less active or energetic than the goat; its dimensions are greater, its muscular strength at least equal both in force and duration. It is also an Alpine animal, and amongst its native fastnesses bounds from rock to rock with almost inconceivable swiftness and agility. The main characteristics of the four unsubdued races of sheep mentioned above are as follows:—The *Musmon* measures about three feet and a half in length, and its height at the highest part of the back is about two feet six inches. The neck is large, the body thick, muscular, and of a rounded form. The limbs are robust, and the hoofs short. The horns of the male are nearly two feet long. The body is protected by a short, fine, gray-coloured wool, of which the filaments are spirally twisted, and by a stiffish silky hair, of no great length, yet sufficient to conceal the wool beneath. It is gregarious in a state of nature, and seldom descends from the highly-elevated portions of the mountains on which it dwells. The general opinion of naturalists is, that it is from this species that we have obtained our domestic breeds. The *Bearded sheep* of Africa has the hair on the lower part of the cheeks and upper jaws extremely long, so that it forms a double or divided beard. The hairs on the sides and body are short, those on the top of the neck somewhat longer, and rather erect. The whole under parts of the neck and shoulders are covered by coarse hair, not less than fourteen inches long; and beneath the hair, on every part, there is a short genuine wool, the rudiments of a fleecy clothing. The tail is very short; the horns, which are about two feet long, approach each other at their base, and diverge outwards.—The *Argali*, or wild sheep of Asia, measures about three feet in height at the shoulder, and five feet in length. His horns are nearly four feet long, and placed on the summit of the head, so as to cover the occiput. They nearly touch each other in front, bending backwards and laterally, and then forwards and outwards. The female is of smaller size, and her horns are nearly straight. The name of *Argali*, applied to this species, is the Mongali name of the female; the male is called *Guldschah.*—The *Ovis montana*, or Rocky Mountain sheep of America, is larger than the largest varieties of our domestic breeds. The horns of the male are of great dimensions, arising a short way above the eyes, and occupying almost the entire space between the ears, but without touching each other at their bases. The hair in this species resembles that of a deer, and is short, dry, and flexible in its autumn growth, but becomes coarse, dry, and brittle as the winter advances. It is doubtful whether sheep are indigenous to this country, but they are mentioned as existing in Britain at a very early period, and it is known that the Romans, during their occupation of it, established a woollen manufactory at Winchester. The many varieties of sheep which tenant Great Britain and Ireland may be conveniently divided into two classes; the first consisting of sheep without horns, and the second of sheep with horns. Of the first class are, the *New Leicester sheep*, the characteristics of which are fineness and fulness of form; in the same apparent dimensions, greater weight than any other sheep; an early maturity and a propensity to fatten, a diminution in the proportion of offal, and the return of most money for the quantity of food consumed, the wool not so long as in some breeds but considerably finer.—The *Cotswold sheep*, which have been long celebrated for the fineness of their wool, and which have been gradually improved by crossing with the Leicester sheep. It is this half-bred Leicester and Cotswold sheep which now chiefly tenants the Gloucestershire and Worcestershire farms. Their mutton is fine-grained and full-sized.—The *Dartmoor sheep*, which have white faces and legs, some with and some without horns, small in the head and neck, and generally small-boned, carcase narrow and flat-sided.—The *South-Down sheep*, which takes its name from a tract of down extending more than sixty miles in length through part of the counties of Sussex, Surrey, and Kent. The wool is short, close, and curled, and free from spiry projecting hairs. The flesh is finely grained and of good flavour. The breed has been much improved during the last few years, not from crossing with other breeds, but by the system of sorting the flocks. —The *Romney-Marsh sheep*, which have long but coarse wool, much internal fat, and much hardihood, and require no artificial food during the hardest winter, but a little hay.—The *Cheviot sheep* are a peculiar breed which are kept on the extensive range of the Cheviot hills. They have the face and legs generally white, and the body long; their wool is short, thick, and fine; they possess very considerable fattening qualities, and can endure much hardship both from starvation and cold.—Of the *Horned sheep*, the chief varieties are:—The *Dorset sheep*, which are principally bred within a circle of twelve miles round Dorchester. They are a good folding sheep, and their mutton is well-flavoured; but their principal distinction and value is the forwardness of the ewes, who take the ram at a much earlier period of the year than any other species, and thus supply the market with lamb at the time when it fetches the highest price.—The *Norfolk sheep*, (now nearly extinct,) a peculiar variety of heath sheep, which has been found in the localities of Norfolk and Suffolk from time immemorial. Their peculiar characteristics give them a greater resemblance to the deer than has been observed in any other species. —The *Merino sheep*, which was introduced into England by George III. from Spain, and which may now be considered to be acclimatised to a certain extent; but as it was ascertained that though the fleece of the Merino did not much degenerate in England, it did not improve, and the carcase, which naturally affords little weight of meat, did not increase, our farmers have found it to their interest to return to their native breeds, and to give up the Spanish sheep.—The *Irish sheep* were formerly ugly and ill-formed, but have been much improved by the importation of English rams.—The *Shetland sheep* are small and handsome; hornless, hardy, feeding even on seaweed, and with soft and cottony wool.—The *Hebridean sheep* is the smallest of its kind, even when fat weighing only twenty pounds. —As a contrast to this, we subjoin a drawing of the *Fat-tailed sheep*, common in Tartary, Arabia, Persia, and Egypt, the tail of which is so loaded with fat that it alone frequently equals in weight the whole carcase of a Hebridean sheep.—Of the other remarkable varieties of the genus *Ovis* in different parts of the globe, we may mention the *Many-horned sheep* of Iceland and the most northern part of the Russian dominions, which has three, four, or five horns, sometimes placed with great regularity, and sometimes differing in proportion and situation.—The *Cretan sheep*, chiefly found in the island of Crete, but kept in many parts of Europe on account of the strangeness of the appearance of its horns, which are remarkably large, long, and spiral; those of the male being upright, and those of the female at right angles to the head.—The *Fat-rumped tailless sheep*, met with in all the deserts of Tartary, and which have long legs, a somewhat arched visage, horns, in the male, like those of the domestic sheep, large pendant ears, and a tail so enveloped in fat as to be scarcely visible.—The *African* or *Guinea sheep*, a native of all the tropical climates, both of Africa and the East. Its distinguishing characteristics are—a rough hairy skin, short horns, pendulous ears, a kind of dewlap under its chin, and a long mane which reaches below the neck. Different names are given to the sheep in this country, according to its sex and age. The male is called a *ram* or *tup*. After weaning, he is said to be a *hog*, *hogget*, or *hoggerel*, a *lamb hog* or *tup hog*, or *teg;* and if castrated, a *wether hog*. After shearing, he is called a *shear hog* or *shearing*, or *dinmont* or *tup*. After the second shearing, he is a *two-shear ram;* and so on. The female is a *ewe* or *gimmer lamb* till weaned, and then a *gimmer* or *ewe hog*, or *teg*. After being shorn, she is a *shearing ewe* or *gimmer*, or *theave* or *double-toothed ewe;* and after that a *two*, or *three*, or *four shear ewe*, or *theave*. The age of sheep is reckoned, not from the period of their being dropped, but from the first shearing.

SHELL, in Nat. Hist. (*See* MOLLUSCA.)

SHELLDRAKE. (*See* SHIELDRAKE.)

SHEPHERD'S DOG, (*Canis familiaris domesticus.*)—The shepherd's dog, which is probably the most extensively diffused of the race of dogs, everywhere preserves some personal characteristics which mark his adherence to the original type. One of these is his quantity of covering, which is in every case great, particularly about the neck: in temperate climates his coat is frequently long and shaggy, in cold ones coarse and crisped, in arid regions long and shaggy, but fine. In England, there are two varieties, the one smooth, short-haired, generally black-coloured on the back, white on the belly, breast, feet, and tip of the tail, with tan-coloured spots on the face and legs; the other being a larger animal, with long hair of different colours, and long flowing tail. The former is sagacious, slow, easily broke and trained, and well suited to work in an inclosed and low country, such as that in which graze the Leicester sheep; whilst the latter are more suited to the country of the Cheviot and black-faced sheep. The sheep-dog of Scotland, known as a "colly," is smaller than either of those above mentioned, and has a more pointed face. The shepherd's dog is asserted by the best authorities to be the least removed from the natural type of the dog, and to live and maintain its proper characteristics while other races often degenerate.

SHIELDRAKE, *sheel-drake*, or SHELLDRAKE, a name given to two handsome British ducks, (*Tadana oulpansh* and *Casacka rutila*,) the latter being the Ruddy Shieldrake. They are beautiful birds, with rich contrasts of jetty black, warm chestnut, and snowy white on the plumage.

SHIPWORM. (*See* TEREDO.)

SHOVELLER, *shu'v-el-ler*, a beautiful British duck, remarkable for the shape of the beak, which is widened and flattened out like a shovel; whence the name. The plumage is beautifully marked with rich green, black, and white, and parts of the wings are soft pale blue. Its scientific name is *Spatula clypeata*.

SHREWS, *shrooz*.—A group of insectionary mammalia, properly called shrew mice, from their diminutive form and mouse-like aspect. There are many species of shrews, amongst which we may notice the following:—The Shrew mouse, or Erol shrew, (*Corsira vulgaris*,) the little creature that is so often seen lying dead in the autumn months. The shrews have very long snouts, and by this peculiarity, as well as by the sharp, pointed teeth, the shrew may be distinguished from the common mouse. The illiterate farm-labourers fancy that this harmless little creature is injurious to cattle. The Water shrew, (*Crossopus fodiens*,) which is always found by the banks of rivers and streams, where it swims about like a miniature water-rat. In order to enable it to swim freely, its tail and toes are edged with a fringe of stiff hairs. The Oared shrew, (*Crossopus ciliatus*,) in which the fur is blacker and the hair fringes larger than in the preceding species. These are English creatures. Among the foreign shrews may be mentioned the Elephant shrew, (*Macusulide proboscideus*,) which has a snout so long as to resemble the proboscis of an elephant. This animal lives in South Africa. The Sondeli, (*Sorex mucimus*,) of India, properly called the Musk-rat, on account of the powerful scent of musk which it exudes, and which is so penetrating, that if a sondeli runs over a corked bottle of wine, the contents are spoiled. It is sometimes called the Mondjourou.

SHRIKE. (*See* BUTCHER-BIRD.)

SHRIMP, *shrimp*, (*Crangon vulgaris*,) a small crustaceous animal allied to the lobster and craw-fish, which frequents shallow waters along the sea-coast. In shape it resembles those animals, but is much more elongated in proportion, and is destitute of the large anterior claws, and it is distinguished from the prawn by the absence of the long anterior serrated spine. The shrimp has ten feet; the tail is as long as the body, and terminated at the extremity with scale-like appendages, which unfold somewhat in the manner of a fan. Whilst alive, the body is of a greenish-gray colour, dotted with brown, and semi-transparent. It is common on the coasts of England and France, and is one of the most delicious of the macrurous crustaceans. The shoals of these creatures which frequent our shores give employment to a great number of persons, who are engaged in catching them. They are abundant at the mouth of the Thames, whence the London market is chiefly supplied. They are caught by a large open net, which is attached to a long stick, and pushed through the water. The crustacean called the fresh-water shrimp (*Gammarus pulex*) belongs to the sessile-eyed crustacean, and is allied to the sand-hopper, *q. v.* (For MANTIS SHRIMP, *see* CAPIELLA.)

SIAMANG, *sy-a-ma'ng*, a black, long-haired, long-armed ape of Sumatra, (*Siamanga syndactyla*,) remarkable for two points in its structure. The first and second toes of the hind paws are united as far as the middle of the second joint by means of a membrane; and under the throat there is a large naked double pouch, which can be inflated to such a degree that it projects far from the neck, in curious contrast with the thick hair of the body. It is easily tamed, and on account of its great agility is an amusing pet on board ship.

SIEBOLDIA. (*See* SALAMANDER.)

SILENUS. (*See* WANDEROO.)

SILKWORM, *silk'-wurm*, the ordinary name of the caterpillar of a lepidopterous insect belonging to the section *Nocturna* and family *Bombycidæ*. It was originally from China, and is of a white or cream colour, with a brown fascia and two or more waved lines of a deeper colour crossing the upper wings. In this country, the eggs of this moth hatch early in May. The caterpillar silkworm is at first of a dark colour, but soon becomes light, and in its tints much resembles the perfect insect. Its proper food is the mulberry, though it will sometimes eat the lettuce and some few other plants. The silkworm is about eight weeks in arriving at maturity, during which period it changes its skin four or five times. For about three days before casting its skin, it is lethargic, refusing its food. On the termination of this period, the old skin opens at the anterior end, the fore-legs are disengaged, and the new and delicately-attired worm escapes forth. Immediately after this renewal, the body of the worm appears gray and somewhat wrinkled, the new coat being made of full size to admit of future growth; but the latter attribute speedily disappears. After the fourth or fifth casting of its skin, it measures from an inch and a half to two inches long; and for a continuous period of about ten days it eats voraciously, and increases greatly both in length and thickness. On the expiry of this last-mentioned period, it has attained the full size of a silkworm, being from two and a half to three inches long. Its desire for food abates; it nibbles and wastes its leaves; then ceases to eat, and becomes restless and uneasy, seeking a quiet haven in which to spin its silken shroud. In the course of about twenty-four hours from the time of its having ceased to feed, the silky fluid becomes abundantly supplied to the interior reservoirs; the body becomes of a soft yellow, and somewhat transparent towards the neck. The beautiful silken covering, or cocoon, as it is called, is generally completed in three or four days. It is commenced by the formation of a loose, decomposed structure, of an oval form, made of what is denominated floss silk. Within this, in the course of the ensuing days, the firmer cocoons are constructed. These are rounded, somewhat oval, balls, varying in tint, some being of a golden tint, some of a straw-colour, and others again white. The included worm, having finished its labour, casts its skin once more, but never appears again as a caterpillar, as it now assumes that rounded, shapeless form termed chrysalis. In the chrysalis state it remains a fortnight or three weeks. It then bursts its horny case, coming forth as a moth into the hollow chamber of the cocoon. The moth subsequently emits a fluid, which has the effect either of dissolving the gum or the threads at one end of the cocoon. The length of the thread in a cocoon varies from six hundred to a thousand feet. The perfect insect is remarkable for its dull and stationary habits.

SILPHA, *sil'-fa*, a gen. of necrophorous beetles, allied to the Burying beetles, and generally found upon or near decaying animal matter.

Silurus, *sy-lew'-rus*, a fish which is plentiful in some parts of Europe, and lately introduced experimentally into English rivers. It weighs from seventy to eighty pounds, and as the flesh is good, it will be a valuable addition to our stores of food, if it can be acclimatised. It is a round, long fish, and has six long fleshy tentacles pendent from its mouth, the two upper being of very great length. The fish is able to direct these tentacles towards any object which it may wish to examine.

Simiadæ, *sim'-e-ă-de*, (Lat. *simia*, an ape,) the name of a quadrumanous fam. of mammalian animals, which embraces the most highly-developed forms of the monkeys. They are all of them inhabitants of the Old World. The nostrils are divided by a narrow septum; they possess opposite thumbs on their fore and hind feet; the callosities on the rump are generally naked. Some of the species only are furnished with cheek-pouches. They usually possess a tail.

Simpai, *sym'-pai*, a little Sumatran monkey, (*Presbytes melalophos*,) remarkable for its very long, but not prehensile tail, and the black crest that traverses the top of the head. The tail is nearly twice as long as the head and body, which may measure twenty inches in length. Several species belong to this genus.

Siren, *si'-ren*, a gen. of reptiles belonging to the perennibranchiate Batrachians, declared by Cuvier to be one of the most remarkable of the class of reptiles, and, indeed, of the whole animal kingdom, from the anomalies of its organisation and its apparent relationship with different families, and even classes. It has the following characters:—Form elongated, nearly like that of the eel; branchial tufts three on each side; no posterior feet, nor any vestige of a pelvis; head depressed; gape of the mouth not wide; muzzle obtuse; eye very small; the ear concealed; lower jaw armed with a horny sheath and several rows of small teeth; the upper jaw toothless; but numerous small pointed retroverted teeth occur on the palatal region. It is a native of America, and is plentiful in the muddy rice grounds of Carolina, where it is popularly called the Mud-eel. Specimens have been brought to England, and lived in confinement. Most persons who saw the siren took it for an eel, and passed it even without notice.

Sirenia, *sy-ree'-ni-ai*, a group of semi-aquatic animals which inhabit the mouths of large rivers and the sea-coasts. The skin is very thick and tough, the body is hairy, the muzzle set thickly with bristles, and the nostrils are at the extremity of the snout. The fore-limbs are formed like arms, and the hind-limbs are modified into a tail. The Manatee, Dugong, and Rytina belong to this group.

Siskin. (*See* Aberdevine.)

Sitta. (*See* Nuthatch.)

Skate. (*See* Ray.)

Skeleton, *skel'-e-ton*, (Gr. *skello*, I make dry,) is the dry osseous framework of an animal body preserved in its natural position. It usually consists of various parts, and when these are connected together by their natural ligaments, it is said to be a natural skeleton, and when they are artificially connected by wires or the like, it is said to be an artificial skeleton. In some of the lowest class of animals, the skeleton consists only of a single piece, in others it is external, in the form of a case. In man, however, and all the higher animals, the skeleton is internal, and composed of numerous pieces adapted to give strength and beauty to the body, and to admit of motion in various directions. (*See* Anatomy, Osteology.)

Skin, *skin*, (Sax. *scin*,) in Anat., is that membrane of variable thickness which covers the whole body externally, and extends inwards into all the natural openings, where it changes its properties, becoming soft and moist, and hence known as mucous membrane. The skin is generally described as composed of three layers,—the cuticle, the *rete mucosum*, and the *cutis vera*, the last being the most internal. The cutis, (*dermis*,) or true skin, consists of two layers, of which the deeper is called the *corium*, and the more superficial the papillary layer. The corium is composed of numerous fibres closely interlaced, and forming a smooth surface for the support of the papillary layer. It varies in thickness, being, as a general rule, thick on the exposed parts and thin on the protected. The papillary layer is soft, and formed by numerous papillæ, which cover its whole surface. It contains the expansions of the sensitive nerves. The rete mucosum (mucous network) lies immediately over the cutis, and in some measure diminishes the inequalities of its surface, being thicker between the papillæ and thinner on their summits. It is composed of minute nucleated cells, and is almost pulpy in consistence. It is very slightly developed in the white races, but is very distinct and thick in those that are darker, the cells, which are filled with a pigment, being that which gives the dark colour to their skin. The cuticle, scarf-skin, or epidermis, is a disorganised scaly substance, serving to protect from injury the more delicate cutis. It is thickest on the most exposed parts; and on the palms of the hands and soles of the feet it consists of several layers. The skin performs various important functions. It is the seat of common sensation, and is furnished with numerous pores or openings, which give passage to the sweat and other exhalations. It is in this way the great regulator of the heat of the body; so that a man can endure severe cold, because the pores close themselves, and severe heat, because they then open, permit the perspiration to escape, and cause a cooling evaporation from the surface of the body.

Skink, *skink*, a name given to a large group of lizards, which have a conical head, distinct eyelids, and the nostrils set in a kind of scaly shield.

Skua. (*See* Gulls.)

Skull, *skull*, (Sw. *skalle*, Lat. *cranium*,) in Anat., is that hard bony case which incloses the brain and forms the head. It consists of eight bones, closely joined together; namely, the frontal bone in front, the occipital bone behind, the two parietal bones on each side, the two temporal bones forming the temples, and the sphenoid and ethmoid bones below, going to the formation of the orbits and nose. Late anatomists have discovered that the skull is in fact formed from vertebræ, the various elements of which are developed or suppressed in order to form them into the shape which is needed for containing the brain and its nerves.

Skunk, *skunk*, (*Mephitis americana*,) a carnivorous quadruped belonging to the fam.

Mustelidæ, inhabiting America; one species being found in the north and another in the south. The skunk is about as large as a cat; it is low on its legs, with a broad fleshy body, white forehead, and the general aspect rather of a wolverene than of a marten; eyes small, ears short and round. A narrow white mesial line runs from the tip of the nose to the occiput, where it dilates into a broad white mark. It is again narrowed, and continues so until it passes the shoulders, when it forks, the branches running along the sides, and becoming much broader as they recede from each other. They approach posteriorly, and unite on the rump, becoming at the same time narrower. The upper lip is furnished with long whiskers; the fur is long and thick, composed of silk and woolly hairs intermixed; the colour is white and blackish-brown, in large masses. The skunk is a nocturnal animal, leaving its burrow at twilight in search of small quadrupeds and the young and eggs of birds. One of its most distinguishing characteristics is its capability of discharging an intolerable stifling stench when threatened with danger,—a stench equally intolerable to men, dogs, and cattle. Yet, when killed so quickly that it is unable to eject the odorous substance, the fur is without more scent than characterises the rest of the weasels, and the flesh is perfectly eatable. The skunk has one litter a year, of from six to ten young.

SKYE TERRIER, *ski*, the largest species of "toy" dog, the smallest seldom weighing less than ten or twelve pounds. A thorough-bred "Skye" has very short legs and a very long body; its neck is strong, and head elongated, while its body and limbs are covered with long straight hair of a slightly wiry texture, which hangs so thickly over its face as to render the eyes and nose almost invisible. These dogs are very clever at learning tricks, and display considerable affection.

SKYLARK. (*See* LARKS.)

SLEPEZ, *slee'p-es*, a remarkable rodent animal of Southern Russia and Mesopotamia, (*Spalax typhlus*.) It is popularly called the Mole Rat. It is without any real organs of vision, even the tiny black specks which represent the eyes being placed under the skin. It is a burrowing animal, and never ventures far from the mouth of its tunnel. To cultivated grounds it is very injurious, as it directs its burrows just beneath the surface of the ground, and eats every root across which it comes. If seized, it can bite fiercely; and the Russians think that any one who has courage enough to allow the slepez to bite him, and then squeeze the animal to death, will have the power of curing goitre by the imposition of hands.

SLOTH, *sloath*, (Sax. *slæwth*,) (*Bradypus tridactylus*,) an herbivorous edentate animal of South America, remarkable for the extreme slowness of its motions and the awkward appearance of its proportions. The arm and forearms taken together are nearly twice as long as the leg and thigh; so that if the animal attempts to walk on all fours, it is obliged to trail itself painfully and slowly on its elbows, and if it stands upright on the hind legs, the arms are so long that the fore-fingers touch the ground. It is accordingly exceedingly helpless when upon the ground, and at home only when on trees, and resting or moving suspended beneath their branches. It feeds on leaves. The head of the sloth is soft, the face small and round, its hair coarse and shaggy, and generally resembling in colour dry withered grass or moss. There are several species of sloth, all inhabitants of the same country, and all possessing similar habits. (*See* AI.)

SLOTH-BEAR. (*See* BEARS.)

SLOW-WORM. (*See* BLIND-WORM.)

SLUG, *slug*, (*Limax*,) a gen. of air-breathing naked gastropodous molluscs. They have an elongated body, and for a mantle a fleshy compact disc, which occupies the anterior part of the body alone, and covers the pulmonary cavity only. This disc contains, in many species, a small oblong and flat shell, or, at least, a calcareous secretion in lieu of it. They feed on herbs and fruits, to which they do much damage. They deposit their ova at any time of spring or summer, when the weather is moist, and bury themselves in the earth during drought and frost.

SMELT, *smelt*, (Sax.) (*Osmerus*,) a small but delicious fish, allied to the salmon, remarkable for its odour, which is singularly like that of a freshly-cut cucumber. It inhabits fresh water from August to May. After spawning in March or the beginning of April, it returns to the sea. Their length is generally six or seven inches. Their generic characters are:—Body elongated, covered with small scales; two dorsal fins, the first with rays, the second fleshy without rays; ventral fins in a vertical line under the commencement of the first dorsal fin; teeth on the jaws and tongue very long, two distinct rows on each palatine bone, none on the vomer except at the most anterior part; branchiostegous rays eight. The smelt, as a British fish, appears to be almost exclusively confined to the eastern and western coasts of Great Britain. Their food is small fish, with crustaceous and testaceous animals.

SMEW, *smeu*, a well-known British sea bird, allied to the cormorants, (*Mergellus albellus*.) It is a very good diver, but walks rather awkwardly. The colouring is very pretty and delicate, the plumage being boldly marked with black and white, and on the head there is a crest of green mixed with white.

SNAILS, *snailz*, (Sax. *snægel*, a snail,) (*Helicidæ*,) a fam. of gasteropodous molluscs living on the land, and breathing air by means of lungs, and possessed of a well-developed external shell. They respire free air in a closed chamber lined with pulmonic vessels, usually placed on the front of the back of the animal, and covered by the shell, and having an opening closed by a valve on the side. They are hermaphrodite, with reciprocal impregnation. The teeth are numerous, and placed in many cross series on the lingual membrane; the head is furnished with four retractile tentacula, the two upper possessing eyes at the apex. The whole body is very glutinous.

SNAIL, POND. (*See* LIMNÆA.)

SNAKE-BIRD. (*See* DARTER.)

SNAKES, *snaikes*, (Sax. *snaca*, a snake,) (*Anguis*,) a gen. of *Ophidian reptiles* differing much in their structure and most of their characters from the true serpents. The animals which are included in this genus are among the most harmless on the face of the earth. There are several species, or rather genera, varying from the common blind-worm of Britain (*Anguis fragilis*) to the Acontias of warmer climates; but they are all equally harmless.

The external characters are :—The scales on the back and belly alike in size, whereas the true serpents have those on the belly larger and free at their posterior edge. The upper jawbones are articulated immediately to the skull and the intermaxillary bones, so that on opening the mouth the animals cannot raise the upper jaw; and as they can depress the lower jaw only a little way, their gape is very narrow. Their motion is not that of the serpents, but consists of a series of alternate archings and straightenings. The Glass-snake of America is one of this group, and, like the blind-worm, snaps off its tail when it is alarmed.

SNIPE, *snipe*, (Du. *snip.*)—The snipes belong to the family of the *Scolopacidæ*. There are several species; those most familiar to the English sportsman and ornithologist being the common snipe, the jack snipe, and the solitary snipe. The common snipe (*Scolopax Gallinago*) is indigenous to this country, breeding in small numbers in most, if not in all, the counties along the southern line of the English coast; but producing its eggs and young much more frequently in the northern counties of England, in Ireland, in Scotland and its islands, than in the south. In addition to our native snipes, great flights come annually from Norway and other parts of northern Europe; seldom remaining long in one situation, but moving from place to place. Towards the end of March or the beginning of April, snipes have nearly perfected their nuptial plumage, and select appropriate places for nidification. The nest is very slight, consisting only of a few bits of dead grass or dry herbage, collected in a depression on the ground, and sometimes upon or under the side of a tuft of grass or bunch of rushes; the eggs four in number, of a pale yellowish or greenish-white, the larger end spotted with two or three shades of brown; the length of the egg about one inch six lines, by one inch one line in breadth. Marshes, moist meadows, and, in frosty weather, the edges of rushy rills, are the haunts of the snipe. In such situations they have been seen pushing their bills quite up to the base, in search of their food, which consists of worms, insects, and small molluscs. The whole length of the common snipe is about ten inches and a half; the length of the beak about two inches and three quarters. In winter, the beak is dark-brown at the end, pale reddish-brown at the base; all the upper part of the head very dark brown, divided along the centre by a single pale brown streak; the back dark brown, slightly spotted with pale brown; the throat white; the cheeks, neck, and upper breast mottled with black and light ferruginous patches; lower breast and belly white; the quills black, the upper ones being tinged with white, and those next the body striated and barred with light ferruginous; the tail consists of fourteen black feathers, barred and spotted with dull orange-red towards the end. The colours of the plumage after the spring moult are brighter and more brilliant than after the autumnal moult. The jack snipe (*Scolopax Gallinula*) is a winter visitor only to this country. It is smaller than the common snipe, and is rather a rare bird; is usually found alone, and will frequently almost allow itself to be trodden on before it will rise. When it does, it wings its way so heavily as to discompose the sportsman as much by its sluggish flight as the larger variety often do by their rapid unsteady dartings. It feeds on bare boggy ground; but when not searching for food, it chooses sheltered situations among strong rushes, or coarse long grass. The solitary snipe (*Scolopax major*) is a very rare bird in England, and is sometimes called the great snipe, being from fourteen to sixteen inches in length. The head-quarters of this bird is the north of Europe. It requires solitude and perfect quiet, and is seldom found except where there is a great extent of marshy meadow. The remarkable sound produced by the snipe, which is called "drumming," has long engaged the attention of naturalists, who have been perplexed by its cause, some saying that it is produced by the vocal organs, and others that it proceeds from the vibration of the air upon the quill feathers of the wing. The question has been set at rest by the Rev. J. G. Wood, who made a series of experiments, in conjunction with other observers, and proved that the "drumming" sound is produced by the action of air upon the feathers, the bird having been repeatedly observed to produce the drumming sound with its wings, and at the same time to pipe with its voice. There are two other snipes which exceed this in size, found in the hilly districts of India; and a third from Mexico, whose size is superior to that of a woodcock. (For SEA SNIPE, *see* DUNLIN and BELLOWS-FISH.)

SNOW-FLECK, *sno-flek*, or SNOWFLAKE, an interesting bird inhabiting northern Europe, and occasionally visiting England, (*Plecteophanes nivalis.*) It is sometimes called the Lapland Bunting. In the summer its plumage is black and brown, with a little white; but in winter the feathers are mostly white, with a patch of dark brown on the wings and back.

SOLAN GOOSE. (*See* GANNET.)

SOLE, *sole*, (*Solea vulgaris.*)—The sole is distinguished from the flounder by having the mouth turned in an opposite direction with respect to the eyes, seemingly deformed, with teeth only on one side, and the front of the head almost always projecting. It inhabits the sandy shores all round our coast, where it keeps close to the bottom, feeding on the smaller testaceous animals, and the spawn and fry of other fishes. As they seldom take any bait, they are caught almost entirely by trawling. The form of the body is a long oval, widest at a short distance behind the head; the colour on the upper side a dark brown, on the under side white.

SOLEN, *soal-en*, a remarkable bivalve mollusc, popularly called, from its shape, the Razor-shell. It is found plentifully on our shores, and is used as bait by the fishermen. It burrows deeply into the bed of the sea, only leaving the extremities of the siphons at the mouth of the burrow, and retreats at the least alarm. It is usually taken by means of an iron rod, bent at the end, by which it is hooked out of its burrow.

SOLENODON, *sole-en'-ŏd-on*, a remarkable animal peculiar to Hayti, and sometimes called the Agouta. It looks very like an opossum, but is in reality allied to the Shrews, *q. v.* The long snout is strengthened by a bone, so that the animal probably digs in the earth.

SOLPUGA, *sol-pew'-gah*, a large and ferocious arachnidan, sometimes called the Galeodes. It is armed with two pairs of powerful mandibles, and uses them with great address, killing not only insects, but animals much larger than itself, such as lizards, mice, bats, &c., fixing its mandibles, and gradually biting its way until it reaches a fatal spot. Even the scorpion is bitten by the solpuga, which seizes it by the tail, cuts off the sting, and devours the body with impunity, afterwards eating the tail itself. Sometimes, however, the scorpion is too quick for the solpuga, and then a sharp blow with its sting slays the intended destroyer at once.

Somateria. (*See* Eider Duck.)

Sondeli. (*See* Shrews.)

Spalax. (*See* Slepez.)

Spaniel, *spăn-yel*, (Fr. *épagneul*,) (*Canis familiaris extrarius*,) a dog of much antiquity, and one whose breed has been particularly attended to in various countries, especially in the Eastern. All the varieties of the spaniel are more or less elegant; and the spaniel has been divided into more varieties than any other dog. The distinguishing characteristics of the race are:—A rather broad muzzle, remarkably long and full ears, the hair plentiful and beautifully waved, particularly that of the ears, tail, and hinder part of the thighs. The prevailing colour is liver and white; sometimes red and white, or black and white; sometimes deep brown or black on the face and breast, with a tan spot over each eye. The true English-bred spaniel, called a springer, differs but little in figure from the setter, except in being not so tall. Their form is also more delicate, their ears longer, very soft and pliable, and covered with a coat of long waving and silky hair; the nose is red or black; the tail bushy and pendulous. The *cocker*, so called from his appropriation to woodcock-shooting, is a still smaller spaniel, and more compact in its frame, and his hair still more waved and curling than that of the springer. The water-spaniel (*Canis aquaticus*) is a sturdy spaniel with crisped hair, and with head rather larger and rounder than those of the land-spaniels. The Alpine, or St Bernard variety of the spaniel breed, exceeds all others in size and beauty. It is generally two feet high at the shoulders, and full six feet from the nose to the end of the tail. The smaller spaniel, King Charles's dog, (*Canis brevipilis*,) is a small variety of the spaniel used as a lapdog. The Maltese dog and the lion-dog (*Canis leoninus*) are small species of spaniel. The first is supposed to have sprung from the intercourse of the little spaniel with the smaller water-dog. It has the hair all over the body very long and silky, and generally pure white. The other has long silky hair about the head, neck, shoulders, and extremity of the tail, but on the other part short, giving the little animal a leonine appearance. The Newfoundland dog is placed by most authorities in the spaniel group, to which its form, its coat, and its hunting propensities, evidently entitle him.

Sparrow, *spăr'-ro*, (Sax. *speara*,) (*Passer domesticus*.)—This well-known bird, the constant attendant of civilised man wherever it is found, is common over the whole of the United Kingdom, including the islands of Orkney and Shetland, as also in Denmark, Norway, and Sweden, being more numerous in the last country, if possible, than with us. From thence southward, its range is extended to Spain, Portugal, and North Africa; in the south-east it is found in Italy, Corfu, Dalmatia, and the Ionian Islands. It is found, in fact, almost throughout the eastern continent, supporting equally well severe cold and extreme heat. Its voracity is extreme; and it is sometimes so numerous as to do great injury to the grain-fields. The beak of the adult male in summer is a bluish lead-colour; the top of the head a bluish-gray; over the ear-coverts, nape of the neck, back and wings, rich rufous brown, the centre of each feather nearly black; tail nearly square; the throat and chin black; the cheeks and sides of the neck grayish-white; breast dull grayish-brown, spotted with black; belly and under tail-coverts grayish-white. The whole length is rather more than six inches. The female has a brown beak; the head and neck of a uniform brown colour; the chin, throat, breast, and all the under surface of the body pale wood-brown. The sparrow forms its nest under the eaves of houses, in holes in the walls, or in any cavity which will afford sufficient space for it. Two or three sets of eggs are produced in the season. The tree sparrow (*Passer montanus*) is distinguished from the common species by the black patch on the cheeks, and the chestnut head. It is not plentiful in the south of England, but is oftener seen towards the north and in Scotland. It derives its name from its habit of building in trees, using a large quantity of grass for its nest. The so-called Hedge Sparrow is not a sparrow at all, but belongs to the accentors, (*Accentor modularius*.)

Spatula. (*See* Shoveller.)

Species, *spe'-sheez*, (Lat.,) a term used in scientific classification to denote a group of such individuals as have an essential identity in all qualities proceeding from their alternate constitution or nature. The term employed to designate a collection of individuals which resemble each other more closely than they resemble any other plants, and which can be reproduced by seed. The following illustration is given by Professor Bentley:—"If we walk into a field of wheat, barley, or oats, we observe thousands of individuals, which, though differing to a certain extent in size, and in some other unimportant characters, we at once associate together under a common name. In a like manner, we commonly observe around us, in the gardens and fields, similar collections of individuals. Such collections of plants thus seen to resemble each other in all their important parts, constitute our first idea of species; and that idea is at once confirmed, if, by taking the seeds of such plants and sowing them, we obtain other plants resembling those from which such seeds have been obtained." Species under certain circumstances are liable to variations, but all varieties have a tendency to revert to their original specific type. A species is generally considered as a permanent production of nature, which is capable of varying within certain limits, but in no cases capable of being altered so as to assume the characters of another species. Sir David Brewster, Darwin, and his followers, hold a different opinion, and contend that species, so far from being immutable, are liable to change of almost any extent; in fact, that plants, by the operation of causes acting over a long period of time, may become so altered that they preserve scarcely any apparent resemblance to those from which they sprung.—*Ref.* Darwin *On the Origin of Species.*

Sperm Whale, or Spermaceti Whale, (*Phy-*

seter macrocephalus,) a species of whale found chiefly in the South Seas. In length, it comes next to the *Balæna Physalis,* but generally exceeds it in bulk. In commercial value it is nearly equal to the *Balæna Mysticetus;* for, although it does not possess the valuable whalebone of that animal, it furnishes us with the substance called *spermaceti,* and is rich in abundance with the finest oil. The sperm whale is also the source of the perfume termed *ambergris.* The spermaceti is obtained from the head, a hole being cut in the upper part, and the liquid spermaceti baled out in buckets. It does not set in the well-known crystalline form until it has been purified. Ambergris is nothing more than a concretion found in the intestines, much like the bezoar stone found in the antelope. Its usual length is about eighty feet, and its circumference between thirty and thirty-five feet; although some have been caught exceeding even these dimensions. Unlike the Greenland whale, it is furnished with a double row of sharp, powerful, conical teeth, each nearly as thick as a man's arm, and coming to a point like a lion's fangs. These teeth are still highly valued by the Tonga islanders, and once were so prized that the possession of a single tooth has caused a war. It is a dangerous animal to attack, as it can use its tail as fiercely as the Greenland species, and can also use its vast jaws with terrible effect, a single bite being sufficient to crush a stout boat to splinters.

SPERMOPHILUS. (*See* PRAIRIE DOG.)

SPHARGIS. (*See* TURTLES.)

SPHYRÆNA, *sfi-ree'n-a,* a large, long-bodied fish, sometimes called the Becuna, that inhabits the Mediterranean, and resembles the pike in form and voracity. Artificial pearls are coloured with the glittering substance obtained from the scales of the becuna.

SPHYRNIAS. (*See* SHARK, HAMMER-HEADED.)

SPIDER, *spi'-der,* (*Arachnida,*) a creature destitute of a distinct head, and wanting antennæ, in which one-half of the body is suspended from the other by a very slender peduncle, in which the integuments are so soft as not to bear the least pressure, whose limbs are so slightly attached to the body that they fall off at a very slight touch. The palpi resemble small feet without a claw at the tip, terminated at most in the females by a small hook, but in the males supporting various appendages, more or less complicated, connected with the function of reproduction in this family. The frontal claws are terminated by a movable hook, which curves downwards, and has on its under-side a little slit for the emission of a poisonous fluid, which is secreted in a gland of the preceding joint. The thorax has upon it a like impression, indicating the region of the head: it consists of a single piece, to which is attached behind a movable and soft abdomen. This part of the body is furnished with four or six nipples, fleshy at the tips, round or conical, jointed, placed close together, and pierced at the extremity with an immense number of minute orifices, or spinnerets, for the discharge of silken threads, which are produced from matter formed in internal reservoirs. The internal apparatus for secreting the silk is lodged within the abdomen near its posterior extremity, and consists of a small number (four or six, according to the species) of twisted, elongated, and unequal-sized vessels, being thickest at the middle, at the extremity of which are a great number of similar vessels, but of much smaller size, and considerably shorter, and which are pressed against each other, uniting in a common base, which is in connexion with the external apparatus. The matter discovered in the internal vessels is analogous to a gum or transparent paste. It is not soluble in spirits of wine or in water; it breaks when it is attempted to be bent, and, like glass, can only be made flexible when it is divided into very thin threads. This matter is discharged from several series of minute bristles, like points, (spinnerules,) surrounding the spinnerets, about one thousand to each spinneret. From these points there exude as many little drops of the above-mentioned liquid, which, becoming dry the moment it reaches the air, forms so many delicate threads. The threads of each spinneret first unite together, and then with those of the neighbouring spinnerets, to form a common thread; so that the thread of the spider, when it suspends itself from any object, is composed of an immense number of minute filaments. The first object which the spider has to accomplish is to attach her thread to some object as the commencement of a groundwork for her future operations. In doing this, it appears that she extends her spinnerets as widely as possible, presses them against the object to which it is intended that the thread should be attached, and then discharges a thread from each of the spinnerules. The insect uses her hind legs as a reel to draw the threads out of her body. The spinnerets of the same spider differ in structure, one set of spinnerets being employed in producing threads which are glutinous, whilst another set produces threads which are smooth. The glutinous threads are made adhesive by the presence of viscid globules, which are set at regular distances. These can be scraped off, and the thread is then without the adhesive property. It is by means of these threads that spiders construct the various webs which they throw from one object to another for the purpose of entrapping their prey, the glutinous threads being arranged in circles and the smooth threads being used as radii. The best-known example of these Arachnidæ is the Garden Spider, (*Eperia diadema,*) which makes the beautiful radiating nets that are so plentiful in fine and warm weather. The Mites, Scorpions, and Solpuga belong to this class. (*See* also BIRD-CATCHING SPIDER.)

SPINDLE-SHELL. (*See* FUSUS.)

SPINE, SPINAL CORD, *spine,* (Lat. *spina,* a thorn.)—The spine, in Anat., is the long articulated bony column at the back of the trunk, extending downwards from the head its entire length. It forms the basis of support of the trunk, and connects all the other parts of the frame. Its interior is hollow, and contains the spinal cord; its lower end rests on the pelvis. It is usually divided into two portions, a superior and inferior; the former flexible, and composed of twenty-four bones, or true vertebræ; the latter more fixed, and composed of nine bones, or false vertebræ. The true vertebræ are divided into cervical, dorsal, and lumbar; the false form the os sacrum and coccyx. Each vertebra consists of two parts, the body of the bone and the arch; the former being solid, convex before and concave behind; the latter being formed of two pedicles and two laminæ, supporting seven processes; namely, four articular, two transverse, and one spinous process. The bodies of the vertebræ are piled one upon another, forming a strong pillar for the support of the cranium and trunk; the arches forming behind a hollow cylinder for the protection of the spinal cord. Between each pair of vertebræ apertures exist, through which the spinal nerves pass from the cord. The several vertebræ are united together by means of a substance compressible like cork, which is firmest and hardest externally, and gradually becoming thinner and softer, till at length in the centre it is in the form of a mucous substance. There are likewise many strong ligaments which unite the bones of the spine to each other. The form and character of the different vertebræ differ considerably in the different parts: those of the neck, called the cervical vertebræ, are smaller in the body, and of a firmer texture, than those of the other parts; the dorsal vertebræ, or those of the back, are of a middle size between the cervical and lumbar, or vertebræ of the loins, the upper ones more nearly resembling the cervical, the lower the lumbar, which last are larger than the dorsal. The first and second cervical vertebræ differ from the other vertebræ of the spine, to allow of the various movements of the head. The first is called the atlas, from its supporting the head, and forms a kind of bony ring; the second the dentata, from the tooth-like process on the upper part of its body, which articulates with the former. The spinal cord is that portion of the cerebro-spinal nervous system which is contained in the spinal canal. Its length is usually about sixteen or seventeen inches, terminating in the adult in a slender filament of gray substance about the lower border of the body of the first lumbar vertebra. It does not nearly fill the canal, its investing membranes being separated from the surrounding walls by areolar tissue and a plexus of veins. Its membranes are three in number. The most external is the dura mater, a strong filamentous membrane, which forms a loose sheath round the cord. The most internal is the pia mater, a cellulo-vascular membrane, which closely invests the entire surface of the cord; while between the two is the arachnoid membrane, an intermediate serous sac, which envelopes the cord, and is then reflected on the inner surface of the dura mater. The surface of the cord is marked by two enlargements,—an upper, or cervical, which is the larger, and extends from the third cervical to the first dorsal vertebra; the arter being situated opposite the last dorsal vertebra. In form, the cord is a flattened cylinder. Its anterior surface presents along the middle line a longitudinal fissure, called the anterior median fissure; and its posterior surface another, called the posterior median fissure. These fissures divide the cord into two symmetrical halves, which are united in the middle line throughout their entire length by a transverse band of nervous substance called the commissure. There are besides several lateral fissures very slightly defined. When cut transversely, the spinal cord is seen to consist of white and gray nervous matter. The former is situated externally, and constitutes its chief portion; the latter occupies its centre, and is so arranged as to present two crescental masses placed one in each lateral half of the cord, united together by a transverse band of gray matter,—the gray commissure. The posterior horn of each crescental mass is long and narrow, and approaches the surface at the posterior lateral fissure, near which it presents a slight enlargement; the anterior is short and thick, and does not quite reach the surface. The gray commissure connecting the two crescentic masses consists of a transverse band of gray matter, and of white fibres derived from the opposite half of the cord and the posterior roots of the nerves. The nerves of the spinal cord consist of thirty-one pairs issuing from the sides of the whole length of the cord, their number corresponding with the intervertebral foramina through which they pass. Each nerve arises by two roots, an anterior and a posterior, the latter being the larger. The roots emerge through separate apertures of the sheath of dura mater, and directly after their emergence a ganglion is formed on the posterior root, the anterior root lying in contact with the anterior surface of the ganglion, but none of their fibres intermingling. Immediately beyond the ganglion the two roots coalesce, and by mingling their fibres form a compound or mixed spinal nerve, which after issuing from the intervertebral canal, divides into an anterior and posterior branch, each containing fibres from both roots. The spinal cord is a nervous centre, or rather an aggregate of many nervous centres, and has the power of conducting impressions or states of nervous excitement. Through it the impressions made upon the spinal sensitive nerves are conducted to the brain, where alone they can be perceived by the mind; and through it also the stimulus of the will applied to the brain excites the action of the muscles supplied from it with motor nerves. As a nervous centre, it has the power of communicating impressions from sensitive to motor nerve-fibres independent of the will, which is usually termed the reflex function of the spinal cord. Thus the movements of the pharynx and œsophagus are involuntary, for the will cannot arrest or modify them. A portion of food being conveyed by voluntary efforts into the fauces, is carried by successive involuntary contractions of the constrictors of the pharynx and muscular walls of the œsophagus into the stomach. These contractions are excited by the stimulus of the food on the sensitive nerves of the pharynx and œsophagus conducted to the spinal cord, and thence reflexed through the motor nerves to these parts. The spinal cord, like other parts of the body, is subject to various diseases, one of the most common of which is inflammation, which may be either acute or chronic, affecting the cord itself or its membranes. It is characterised by pain more or less acute, extending throughout the length of the spine, or confined to a certain portion of it. It is much increased by every movement of the spine, and in many cases is more or less intermittent. It frequently also gives rise to spasmodic or paralytic affections of various parts. It is always a highly dangerous disease, and in general requires similar treatment with inflammation of the brain. (*See* BRAIN, DISEASES OF THE.) *Spina bifida*, or divided spine, consists in an imperfection of the posterior part of the spinal canal, and is almost always accompanied by an excessive secretion of the spinal fluid. It is almost always characterised by a tumour situated over the defective vertebræ, and varying in size according to the extent of the fissure in the spinal canal. It commences when the spine is being formed in fœtal life, and may continue for ten, or even twenty years, without affecting the general health; but the tumour is liable to inflame and ulcerate by friction, and thus produce death. A gentle pressure on the tumour, so as to resist the effusion of the fluid, is recommended.

Spleen, *spleen*, (Gr. *splen*,) in Anat., is a spongy viscus, of a livid colour, oval in figure, and situated in the left hypochondriac region, between the eleventh and twelfth false ribs. It is convex externally and concave internally, and its weight in the healthy adult is from four to ten ounces. It is largely composed of cells, but its internal structure is not well understood, neither have its uses been ascertained; but it would seem to be in some way of use to the stomach during the process of digestion. The ancients regarded it to be the seat of all ill-humours, as anger, melancholy, &c.; and hence the term splenetic applied to such as are cross and crabbed.

Sponges, *spunj'-ez*, (Lat. *spongia*, a sponge,) certain marine productions, the family of *Spongiadeæ*, or *Porifera*, a division of animals of the class called *Protozoa*. For a long period it has been a disputed point as to whether sponges are animals or vegetables. In the "Principles of Zoology," by Agassiz and Gould, published in 1848, they are said to belong to the vegetable kingdom; but the most recent authorities have proved their animal nature. The texture of the ordinary sponge (*spongia*, Linn.) is cavernous and porous. Its great elasticity, and its property of imbibing and as readily parting with a large quantity of water, render it useful. In choosing sponge, it should be selected as light as possible, and free from stone, of as pale a colour as possible, with small holes, and fine and soft to the touch. The sponges of commerce are procured chiefly in the Mediterranean and the Bahama islands; they are mostly obtained by diving, to which persons are trained from childhood in the Greek islands. Sponges are remarkable for the beautiful calcareous spicules with which their skeleton is marked. They are microscopically minute, and differently shaped and coloured; and by their interlacing the form of the sponge is preserved, together with its elasticity. The adhesion of the sponge to the bottom is generally firm and the growth slow. The coarse sponges used for horses and carriages are chiefly obtained from the Bahamas.

Spoonbill, *spoon'-bill*, a curious bird belonging to the herons, (*Platalea lencondia*,) and remarkable for the shape of the beak, which is long, and at the tip is much widened and flattened, so as to resemble a spoon. In the East the mandibles of this bird are sometimes used as spoons, being scraped and polished until they are quite thin and translucent. In the Arabic the bird is called Cocknos. The colour of the spoonbill is white, with a slight shade of pink like that of the pelican, and there is a band of yellow across the breast. The spoonbill inhabits various parts of Africa and Asia, and the southern portions of Europe.

Sprat, *sprăt*, (Ger. *Sprotte*,) (*Clupea Sprattus*.)—This fish was formerly confounded by naturalists with the young of the herring; it is now, however, generally admitted to be a good and distinct species. Its characters are as follows:—Proportions nearly the same as those of the herring, but the depth of the body is greater in proportion than in the young of that species; the gill-covers are not veined; the teeth of the lower jaw are so minute as to be scarcely perceptible to the touch. The dorsal fin is placed farther back, and the keel to the abdomen is more acutely serrated than in the herring. They inhabit the deep water round our southern coast during the summer months, and, like the other species of the genus *clupea*, they are wanderers: the shoals are capricious in their movements, and extremely variable in their numbers. Fishing for them begins early in November, continuing through the winter months; and the largest quantities are taken when the nights are dark and foggy. They are a cheap and agreeable food during all the winter months of the year, but are sometimes so plentiful as to be sold for manure to the farmers, who distribute about forty bushels of sprats over an acre of land, and sometimes manure twenty acres at a cost of twenty shillings an acre. A full-sized sprat measures six inches in length, and rather more than one inch and one-eighth in depth. The tail is deeply forked; the scales are round, large, and deciduous. The upper part of the head and back are dark blue, with green reflections, passing into silvery white on the gill-covers, sides, and belly.

Spring-beetle. (*See* Elateridæ.)

Spring-bok, *spring-bok*, a beautiful antelope of Southern Africa, (*Antidorcas euchore*.) This animal is found in vast herds containing hundreds of thousands, and when a herd passes from one part of the country to another, the sight of the living mass is magnificent. These moving herds are called trek-bokken. The spring-bok derives its name from its wonderful power of leaping, the animal being in the habit of springing high into the air, for no apparent reason. The real cause of this conduct is that the antelope may form a better view of the surrounding country. When it is in the open plains it does not often leap, but when the view is at all obstructed by high grass or bushes, it is continually springing into the air. When it leaps it curves the back in a curious manner, and in so doing exhibits a large white patch near the root of the tail, which is covered with long ruddy hair while the animal is at rest. Both the hide and flesh of the spring-bok are valuable. The native name for the animal is Tsebe.

Squabus. (*See* Sharks.)

Squid. (*See* Cuttle-fish.)

Squirrel, *skwir'-rel*, (*Sciurus*,) a genus of quadrupeds belonging to the *Rodentia*, or Gnawers, and distinguished from most animals of the tribe by the compressed form of the lower incisors. The upper lip is cleft, the fur soft and silky; the molar teeth are four on each side of the lower jaw, and five in the upper, the first of which is only a small tubercle, often shed with age; the incisors are two in each jaw; the toes are armed with hooked nails, by means of which they are enabled to climb trees, in the midst of which they pass their lives, feeding on fruit. They have fine full eyes, an elegant contour, great activity, and a long bushy tail. They are furnished with proper clavicles, and possess the use of the fore-arms and jaws in great perfection. The hardest nuts serve them for nutriment, and they cut through the shells with remarkable facility. They generally build nests of sticks and leaves in the tops of trees, and sometimes in hollow trunks. Previous to the approach of winter, they lay up large hoards of nuts and grain for future use. In feeding, they sit upon their haunches, and hold their food between their paws, while they work at it with their teeth. The group of squirrels has been divided by some naturalists into ground squirrels, (*Tamias*,) flying squirrels, (*Pteromys*,) and tree squirrels, (*Sciurus*.) The ground-squirrel has been separated by other naturalists from the true or tree squirrels, on account of its having cheek-pouches. Its manners also differ altogether from those of the tree squirrels. It burrows in woody districts, in small hillocks, or near the roots of trees; but never makes its nest in the trunks or branches, although, when frightened, it climbs them with ease. The nest is reached by a winding tunnel, which is often of considerable extent. The head is longer than that of the common squirrel, and the roundish hairy tail is seldom turned up. The chipping squirrel, (*Tamias Lysteri*,) sometimes called the chipmuck or hackee, is a pretty little creature, inhabiting North America, and living in burrows under ground. Its tunnels are very complicated, and the animals have regular storehouses, in which they place the acorns, buckwheat, maize, and other provisions for the winter. (*See* FLYING SQUIRREL and PETAURISTS.)

STAG, *stăg*, the male of the red deer; the male of the hind.

STAGHOUND.—The staghound and the largest foxhounds are said by good authorities to be identical species. However this may be, it is very certain that the modern staghound has been crossed with the foxhound, and that to this fact he owes a portion of his speed. In former times, the English staghound was a large and stately animal, equal, or little less than the bloodhound; and originally, like that race, slow, sure, cautious, and steady. The modern hound is, perhaps, still handsomer, though somewhat smaller. It is still the largest hound in Britain. It has a large and rather short head, with a wide nose, loose, hanging, broad, and long ears, muscular hams, round small feet, and a rush tail, carried high. They were formerly rufous-coloured or glaucous, but are now invariably white, with some black and fulvous about the ears and on the sides or back, distributed in two or three large spots.

STAG-BEETLES (*Lucanidæ*) derive their name from the large and powerful mandibles with which the males are furnished. The English stag-beetle (*Lucanus Cervus*) is the largest and most formidable-looking of all the British coleoptera. It inhabits the interior of oaks and beeches for several years before assuming its final transformation; and its larva is supposed by some to be the *cossus* of the Romans, a vermiform larva esteemed by them as a great delicacy. Stag-beetles remain hidden during the day, and take flight at dusk. The females are sluggish, and not so numerous as the males, which fight with great ferocity amongst themselves for possession of their mates. When full-grown, the larva forms a cocoon of the dust of wood which it has ground down by its jaws, and after remaining some time as a pupa, undergoes its final transformation, to pass a very brief portion of its life as a perfect insect. Some of the foreign genera of stag beetles are very brilliantly coloured.

STALK-EYED CRUSTACEA.—Those which have the eyes set at the end of footstalks of variable length, The lobster, shrimp, and crab are examples of this group.

STAPHYLINIDÆ, (*staf-y-line-id-ee.*)—A large family of beetles, which have long bodies and very short elytra. From their habit of turning up their abdomen, they are popularly called cocktail beetles.

STAR-FISH, (*Asterias.*)—This animal has a suborbicular depressed body, its circumference divided into lobes or rays, each of which has a longitudinal furrow on its lower side; and this furrow is pierced laterally with small holes, through which pass the feet or tentacula, which are membranous, cylindrical, and each of them terminated with a little disk, which performs the office of a cupping-glass. By shortening or elongating these numerous little organs, the progressive motions of the star-fish are regulated. Its powers of reproduction are considerable; for if by any violence a ray be broken off, a new one will shortly be produced. The digestive apparatus is not confined to the central disk, but extends into the rays. The mouth is armed with bony teeth, with which the animal seizes and crushes the shell-fish on which it feeds. Some of the species attain an enormous size.

STARLING, *star'-ling*, (*Sturnus*,) a genus of birds belonging to Cuvier's great order *Passeres*. The characters of the genus are these:—The bill straight, conical, depressed; four toes on the feet, three to the front and one to the rear; the wings long, the first quill little more than rudimental, and the second and third the longest in the wing. The starlings are noisy but social birds, being generally found together in flocks, more or less numerous, and they can be taught to articulate. The common starling (*Sturnus vulgaris*) is about eight or nine inches in length. The upper parts of the plumage are black, with reflecting glosses, which vary from green to purple, according to the light in which they are seen. The quills and tail-feathers are blackish, with ash-coloured borders, and the under coverts of the tail have broad borders of a whitish colour. They are partly migratory and partly not.

STEINBOK, *stine-bock*. (*See* IBEX.)

STELLIO, *stel'-ly-o*, a gen. of lizards belonging to the fam. Agaonidæ, and remarkable for having the tail covered with spine-like, projecting scales, in regular rings. They inhabit parts of Africa and Asia.

STERNA. (*See* TERNS.)

STERNUM, *ster'-num*, (Ger. *sternon*,) is the breastbone, an oblong, flat, irregularly-shaped bone, placed at the forepart of the thorax. In the young subject, it consists of a number of bones, which become united in the adult, when it consists of three, and sometimes of two, or even of one bone. It serves for the articulation of the seven upper or true ribs on each side, is of use in aiding respiration, and defends the heart and lungs.

STICKLEBAT, STICKLEBACK, or TITTLEBAT, *stik'-el-băt*, the common English name for certain small fishes, constituting the genus *Gasterosteus* of Linnæus, and containing both fresh and salt water species. The *rough-tailed three-spined sticklebat* is one of the smallest, as well as the most common of our fishes, being found in every river, brook, and lake, and being common all round the coast. It is active in its movements, pugnacious in the extreme, and extremely voracious. Their food consists of worms, insects, and the minute fry and roe of other fishes. They spawn in summer; the females, generally paler in colour than the males, depositing their ova, which are large but few, on the leaves of aquatic plants. They are so numerous that they are frequently strewed over the land as manure. This species seldom exceeds two and a half inches in length, and is distinguished by having its sides defended by a series of bony plates, arranged vertically along their whole length. The colour of the back is green; the cheeks, sides, and belly, silvery-white. Another species of sticklebat is the *fifteen-spined sticklebat*, which seldom, if ever, is found in fresh water, and sometimes attains the length of six inches.

STILT, *stilt*, a curious British bird allied to the plovers, (*Himantopus candidus.*) It is remarkable for the great length of the slender legs, which are longer in proportion to the body than those of any other bird. Several species of stilts are known.

STINT. (*See* DUNLIN.)

STOAT. (*See* ERMINE.)

STOMACH, *stum'-ăk*, (Gr. *stomachos*, also *gaster*,) in Anat., is the large membranous receptacle which receives the food from the œsophagus, and within which it is acted upon by the gastric juice and converted into chyme. It is situated in the left hypochondriac and epigastric regions, and when distended, it has the shape of an irregular cone, having a rounded base, and being curved upon itself. The left extremity is the larger, and is called the greater splenic end of the stomach, the right or small end being called the pyloric. The œsophagus terminates in the stomach two or three inches from the great extremity by the cardiac orifice; while by the pyloric orifice at the other end the digested matter enters the duodenum. When moderately filled, the stomach is about ten or twelve inches in length, and its diameter at the widest part about four inches. The walls of the stomach consist of four distinct coats, held together by fine areolar tissue, and named, in order from without inwards, the serous, muscular, areolar, and mucous coats. By some the areolar is not reckoned a distinct coat. The first of them is a thin, smooth, transparent, elastic membrane derived from the peritoneum. The muscular coat is very thick, and composed of three sets of fibres, the longitudinal, circular, and oblique, which form three layers. The areolar and fibrous coat is a tolerably distinct layer placed between the muscular and mucous coats, and connected with both. The last is a smooth, soft, rather thick and pulpy membrane, loosely connected with the muscular coat, and covered with exhaling and inhaling vessels. At the pyloric orifice leading from the stomach into the duodenum there is a sphincter muscle, which contracts the aperture and prevents the passage of any matter into the intestines until properly digested. The food is propelled along the œsophagus, and enters the stomach in successive waves through its cardiac orifice. It is there subjected to a peculiar peristaltic motion, having for its object to produce a thorough intermixture of the gastric fluid with the alimentary mass, and to separate that portion which has been sufficiently reduced from the remainder. This motion causes not only a constant agitation or churning of the contents, but also moves them slowly along from one extremity to the other. These revolutions are completed in from one to three minutes, being slower at first than after chymification has more advanced. The passage of the chyme or product of the gastric digestion through the pyloric orifice into the commencement of the intestinal tube is at first slow; but when the digestive process is nearly completed, it is transmitted in much larger quantities. (*See* DIGESTION, GASTRIC JUICE.)

STONE-BASSE, *stoan-bass*, a fish belonging to the Acanthopterygii, and called the Jew-fish, a wreck-fish, a cherne, or chernotte. It derives its name of wreck-fish from its habit of frequenting wrecked ships. Fishermen are cautious of handling the stone-bass, as its operculum and several fins are armed with sharp spines. Its scientific name is *Polyprion cernium.*

STORKS, *storx*, an important group of birds, containing many curious species. The common stork (*Ciconia alba*) is now banished from England, but is plentiful in many parts of Europe and Africa. It is a tall, long-legged bird, with a remarkably long and powerful beak. It feeds mostly upon reptiles and large insects. In Holland and Germany it is carefully protected, and builds its huge nest in the tops of houses and chimneys, and no one will think of disturbing the birds or taking their eggs. It is considered a fortunate omen if the bird takes possession of a house, and its departure is considered equally unlucky. (For WHITE-HEADED STORK, *see* BALÆNICEPS.)

STRAND WOLF. (*See* HYENAS.)

STREPSICEROS. (*See* KOODOO.)

STREPSIPTERA, *strep-sip'-te-ră*, (Gr. *strepho*, I twist; *pteron*, a wing.)—These insects were discovered by Kirby, living parasitic in the abdomen of some Andrenæ. At first nondescript, and not referable to any order, they were afterwards placed in an order by themselves. The larvæ live in the bodies of bees, wasps, &c. Only the males undergo perfect metamorphosis, the females, even when adult, being without legs, wings, or eyes, and continuing to live parasitic within the bodies of the hymenopterous insects within which they were born. About ten or twelve different species are known, forming a small family called *Stylopidæ*, of which the genus *Stylops* is the type. Their real position in the scale of creation is, however, still uncertain.—*Ref.* Baird's *Cyclopædia of the Natural Sciences.*

STRIGOPS, *stri'-gops*, a remarkable bird belonging to the cockatoos, and called, from its resemblance to an owl, the owl-parrot. It is a native of Australia, and is called kakapo by the aborigines. Its head is round, its beak is small and much curved, and its eyes are sunk in the feathers of the head very much like those of the owl. It is a large bird, and the general colour is dark green, splashed with black and yellow.

STRIX. (*See* OWLS.)

STRUTHIO. (*See* OSTRICH.)

STURGEON. (*See* STURIONIDÆ.)

STURIONIDÆ, *stu-re-o'-ne-de,* (Lat. *sturio,* an icicle, because the snout tends to a point like an icicle,) a fam. of fishes belonging to Cuvier's division called *Chondropterygians,* or cartilaginous fishes, the skeletons of which are made up of cartilage instead of true bone. Four genera are contained in this family,—*Accipenser, Spatularia, Chimæra,* and *Callorhynchus.* To the first of these belongs the common sturgeon. The general form of this fish resembles that of the shark; but it is distinguished by longitudinal rows of bony plates or bones implanted on the skin; the head is defended by similar plates; the mouth is small, and, as in sharks, placed below the snout; while the mouth is capable of some degree of projection, by its position on a style with three articulations. Instead of teeth, the mouth is furnished with a sort of horny process on the jaws. The lower jaw is furnished with a sort of beard of soft fibres. When viewed from below, the mouth looks like a short, soft, oval, fleshy tube, and seems quite inadequate to the task of procuring food. The eyes and nostrils are placed laterally and wide from each other. There is no vestige of an external ear, but the labyrinth is perfect within the bones of the head. The tail is forked, the upper lobe being much the longest and pointed. Sturgeons are mostly large, and inhabit the shores of the temperate latitudes rather than either the torrid or the cold. They are marine fishes, and at certain seasons ascend in vast numbers particular rivers, where they are the subject of extensive fisheries, particularly in the large rivers which disembogue themselves into the Black Sea and Caspian, and the rivers of France and Prussia; they abound also in the large rivers of North America, where the species appear to be peculiar to that continent. The common sturgeon (*Accipenser Sturio*) is generally about seven or eight feet in length. Its whole body is very gelatinous; and the air-bag, when freed from fat and oil, is the purest gelatine that is obtained in the animal kingdom, and forms the genuine isinglass of commerce. Its flesh is white and delicate, resembling veal. Its roe forms common *caviar.* When caught in the Thames, within the jurisdiction of the Lord Mayor, it is considered a royal fish; the term being intended to imply that it ought to be sent to the sovereign; and it is said that the sturgeon was exclusively reserved for the table of Henry I. of England.

STURNUS. (*See* STARLING.)

SUCKING-FISH, *suck-ing,* a well-known fish, inhabiting the warmer seas (*Remora*), and notable for the curious sucking apparatus which occupies the upper part of the head and neck, and which is in fact a modification of the dorsal fin. By means of this apparatus the sucking-fish attaches itself to various objects, particularly to ships, boats, and large fishes; and it was once thought that such a fish could detain a ship from proceeding on her voyage.

SUCTORIA, *suk-to'-re-ă,* an ord. in Ent., so designated on account of their sucking propensities. The genus *Pulex* of Linnæus constitutes the entire order. The mouth consists of a sucker of three parts, contained between two articulated blades, forming by their union a trunk or beak. The order is not numerous in species. The *Pulex irritans* is the common flea, (*see* FLEA;) the *Pulex penetrans* is the CHEGOE, (which *see.*)

SUIDÆ, the Hog family, (which *see.*)

SULA. (*See* GANNET.)

SUNFISH, *sun-fish,* a curious fish found in the warmer seas. It is so wide and so short that it looks like a very large fish cut off just behind the head. It belongs to the order Pectognathi, or fishes with fixed jaws. It sometimes attains a very great size, reaching six feet in length. Its scientific name is *Orthragoriscus mola,* this specific name being given because it is round like a millstone.

SURICATE. (*See* Zenick.)

SWALLOW, *swol'-lo,* (Sax. *swelgan.*)—This is the only species of the group Hirundo which with us is called a swallow, the others being either martins or swifts. The chimney or house swallow, as it is frequently called, is supposed to hatch and breed in Africa, probably to the south of the equator, and is a periodical visitor to this country, generally arriving about the 10th of April, and remaining six months. The general colour of the swallow is black, with reflections of grayish-blue; the throat and forehead are deep reddish-brown, and there is a white spot on the inner web of each of the tail-feathers, with the exception of two in the middle, which are the shortest; the lateral tail feathers are very long, and give a remarkable forked appearance to the tail. The upper part of the breast is black, the lower part and belly white; the whole length is about eight inches and a half, of which the elongated tail-feathers measure nearly five inches; the wings are long and pointed, reaching beyond the end of the second tail-feather. On reaching this country, they form their nests in chimneys, under the eaves of houses, old ruins, &c. The nest is formed of small portions of moist earth, which the bird may be seen collecting at the edges of ponds or the margins of puddles by the road-side. The nest is made in an open saucer-shaped form, and is lined with feathers. The eggs are generally from four to six in number, white, speckled with ash-colour and dark red. Two broods are produced in the season. Swallows are very active, gliding and darting about with great lightness, and apparently very little motion of the wing, every stroke apparently sending them forward as if shot from a bow. The note of the adult swallow is a soft and sweet warble. There are many species of swallow found in different countries, among which may be noticed the esculent swallow, so remarkable for the nest which it makes, and which is eaten by the Chinese. The nest is a singular structure of some gelatinous substance, probably produced by macerating algæ, and is composed of a vast number of threads, crossing and re-crossing in every direction. Before the nest has been used it is nearly white and translucent, and is then purchased at an extravagant price. It is eaten by being made into soup, and is said to resemble in flavour and consistency the green fat of turtle-soup. The scientific name of this bird is *Collocalia nidifica.* It is a native of Java, and builds its nest on the sides of precipitous rocks, so that the mode of obtaining it is exceedingly dangerous.

SWAN, (*swon,*) (Sax. *swan,*) (*Cygnus,*) a gen. of web-footed swimming birds, found on the rivers and small pools of fresh water, and distinguished by their graceful and majestic appearance. In some of their species the swans approach the geese in many of their characters, whilst the typical ones differ considerably. The leading characters of the swans, considered as a genus of *Anatidæ*, are these :—The bill as wide at the tip as at the basal part ; and higher than wide at the base ; the nostrils are pierced about the middle of the length of the bill, and the neck is very long as compared with that of the other web-footed birds. The colour of the plumage is in general pure white, but a black species exists. They swim rapidly, and their flight is powerful and long-continued ; they live in society, but in the breeding-time they are strictly monogamous, and the pairs take up their nesting-grounds at some distance from each other. They make their nests near the margin of the water, upon the ground, and attain a great age. They feed generally upon seeds, roots, and other parts of aquatic plants which are blanched and succulent by being under the water ; but it is asserted by some writers that they also eat fish-spawn, frogs, insects, and worms. Their flesh is hard, black, and rank in the old ones, and not very good in the young ones. Their skins, feathers, and down, and especially the latter, are used for several purposes. There are several species, and one, the black swan of Australia, was long regarded as a bird impossible to be found. The scientific name of this bird is *Cygnus atratus*. It is smaller than the common species, and not so graceful, its neck being held quite stiff, and seldom arched, as is usually the case with the white swan. It is quite black, with the exception of the white quill feathers of the wing, and the scarlet mandible, which latter is worn by the natives as a kind of charm. The wild swan, whistling swan, or hooper, (*Cygnus ferus*,) so called on account of the peculiar note uttered by this bird, is a winter visitor to the British islands ; they also visit Holland, France, Provence, and Italy, and sometimes go as far south as Egypt and Barbary. It is a native of the northern parts of both the Eastern and Western continents, and is the first of all the Anatidæ to return north. The bill is black, and depressed in its anterior part, whilst the posterior is quadrangular and yellow. The plumage is white, but with a yellowish tinge on the head and upper part of the hind neck. The length of the full-grown bird is rather more than four feet and a half. The tame swan, or mute swan, is one of the most graceful and largest of British birds, and differs from the wild swan in that it has the anterior portion of the beak yellow, and the base black, with a prominent black tubercle or knob on the upper part in front of the forehead. It is rather shorter than the whistling swan, but longer in the wings.

SWIFTS, *swifts*, a group of birds allied to the swallow, but known by their very long wings, and the formation of the foot, all the toes of which are directed forward. The common swift (*Cypselus apus*) is a well-known summer visitant of Great Britain, and is always notable for its prolonged and rapid flight, and the shrill screeching sound which it utters. Like the swallow, the swift feeds exclusively on insects, and catches them as they fly through the air. There are several species of swift, one of which, the Alpine swift, (*Cypselus melba*,) is an occasional visitor of our shores.

SWORDICK. (*See* BUTTER-FISH.)

SWORD-FISH, (*Xiphias gladius*,) a gen. of fishes remarkable for having the upper jaw prolonged somewhat in the form of a sword, and constituting at least one-third of the total length. The body is elongated, nearly round behind, but a little compressed ; upper part of the head nearly flat, slightly descending to the base of the sword, which is formed by an extension of the vomer, maxillary and intermaxillary bones. There are no proper teeth, and no true tongue. The whole of the body is covered with a rough skin. The gills are peculiar, not consisting of fringes in the form of the teeth of a comb, as is usual among bony fishes, but each consisting of two large parallel laminæ, with reticulated surfaces. The whole of the under part of the body is of a fine pure silver-colour, shaded with bluish-black on the upper part. Very young specimens, of twelve or eighteen inches long, have the body covered with small tubercles, which disappear as the fish increases in size, first on the back, and afterwards on the belly, and by the time it attains the length of three feet, are no longer apparent. The sword-fish is sometimes more than twenty feet long, the beak included. It swims with greater swiftness than almost any inhabitant of the deep, and is possessed of vast muscular strength. It attacks and puts to flight the smaller cetaceous animals, notwithstanding its food is usually vegetable. The flesh of the adult is said to be hard but good, that of the young fish white, agreeable, and nourishing. The sword-fish is very abundant in the Mediterranean, where it has attracted much notice from very early times ; but though longest and best known to naturalists as an inhabitant of the Mediterranean, it often roams into the ocean, generally taking a direction either northward or southward of the Straits of Gibraltar. From the time of the very earliest authentic notice of British fishes, it has been included in the number, though only as an occasional straggler. In the Mediterranean it approaches the shore in May, and remains for about three months.

SYLVIA, *sil'-vi-ah*, a large gen. of birds, belonging to the family of the Luscinidæ, and comprising the warblers and other similar birds. Members of this genus are found in most parts of the Old World.

SYNGNATHUS. (*See* BILL-FISH.)

T.

TABANUS. (*See* GADFLIES.)

TADORNA. (*See* SHELDRAKE.)

TÆNIA. (*See* TAPEWORM.)

TADPOLE, *tăd-pole*, (Sax. *tad*, toad, and *pold*, a young one,) a young frog before it has disengaged itself from the membranes that envelop it in its first stages of life.

TAGNICATE. (*See* PECCARY, WHITE-LIPPED.)

TAGUAN, *tag-wan*, one of the flying squirrels, (*Pteromys petaurista*,) which is tolerably plentiful in many parts of Asia. Including its tail, it is nearly a yard in length.

TAILOR-BIRD, *tay-lor*, a remarkable little bird belonging to the warblers, (*Orthotomus longicaudus*,) and inhabiting India. It make

Stag Hound

Stag.

Malabar Squirrel.

its nest in a very curious manner. Sometimes it chooses two leaves growing near each other, and with some vegetable fibre sews their edges together, using its beak as an awl, and the fibre as thread; it then stuffs the hollow between the leaves with down, and after making a suitable depression, lays its eggs there. Sometimes it chooses a single large leaf, and draws its edges together in a similar fashion.

TALITRUS. (*See* SANDHOPPER.)

TALLEGALLA. (*See* BRUSH TURKEY.)

TALPA. (*See* MOLE.)

TAMANDUA, *tăm-an'-dew-ah*, one of the ant-eaters of Brazil, which can climb trees, and feed on the insects which traverse the branches.

TAMANOIR. (*See* ANT-EATER.)

TAMIAS. (*See* SQUIRRELS.)

TANAGERS, *tan'-ăg-urs*, a beautiful group of birds, having the bill transverse at the base, and rather arched at the tip.

TANREC, *tan-rek*, a remarkable insectivorous animal found in Madagascar, and there called the Native Hedgehog, (*Centetes ecaudatus.*) Its body is covered with an array of short spines, but it cannot roll itself up like the true hedgehog. No external tail is visible. In spite, or rather by reason of its powerful musky smell, the natives eat the tanrec, and think it a great luxury.

TAPIR, *tă'-peer*, (*Tapirus,*) a pachydermatous animal belonging to the ord. *Ungulata* and fam. *Elephantidæ*. There are three known species of the tapir, two of which inhabit South America, while the third is found in Sumatra and on the peninsula of Malacca. The characteristics of the genus are as follows: The muzzle is prolongated into a short proboscis, which is simple at the end; the skin is covered with hair; the skull is of a sort of pyramidal form, resembling that of the pig, and the nasal bones are much arched, so as to give support to those muscles from which the proboscis depends; the tail is extremely short; the jaws are furnished with six incisors and two canines (very small) in each, and the upper jaw has seven, and the under six molars on each side; the feet have four toes on the front feet and three on the posterior ones; the neck is high, and is furnished with a sort of mane formed of upright bristles; and in their form, generally, they are not at all unlike the hog family, with the exception that the legs are usually longer. The best-known species is the common American tapir, (*Tapirus terrestris*, or *americanus,*) called the Mborebi. This is a large animal, nearly six feet long, and measuring about three feet and a half high. The skin is very thick, and covered with short brown hair, and it is found in nearly all parts of Southern America, from Panama nearly to the extreme south. It inhabits the most tropical forests, near water, in which it often bathes, and is more of a nocturnal than a diurnal animal. Altogether it is a harmless animal, and when attacked generally seeks safety in flight, although it is said to frequently crush its most cruel enemy, the jaguar, with its body against the limbs of trees, when that animal assails it. The diet of the tapir is purely vegetable, and it often inflicts great loss on planters by its predilection for various roots, which it digs up in large quantities, laying waste large tracts of ground. The other South American species (*T. villosus*) is but little known, and is distinguished from the former by the greater length of its hair. It is principally found inhabiting the Andes, at a height of some 3000 to 3600 feet above the level of the sea. The remaining variety—*Tapirus malayanus*, Malayan tapir, or Kuda ayer—is much larger than either of the species just described, as it measures some seven or eight feet in length, and is of proportionate height. It is of a very heavy, massive appearance, and is remarkable for the peculiar colouring of its body, its fore quarters being of a glossy jetty black, while its hind quarters, back, and sides, are pure white. The proboscis or trunk is also developed more than in the American varieties, as it measures some eight inches in length. The eyes are very small and round, and the ears are also round, and are tipped with white. In habits and disposition the Indian tapir greatly resembles those of America; so they call for no special description. It is said to exist abundantly in China, but hitherto it has only been found in Borneo, Sumatra, and Malacca.

TAPE-WORM, *taip-wurm*, a well-known animal belonging to the Entozoa, (*Tænia,*) which inhabits the intestines and other digestive organs of human and other beings. There are many species of Tænia, and there is scarcely an animal that does not possess its own species.

TARANDUS. (*See* REINDEER.)

TARANTULA, *tă-răn'-tu-lă*, (Ital.) (*Lycosa Tarantula,*) a spider belonging to the fam. *Araneidæ*, the third order of the class *Arachnida*. The tarantula is a native of the south of Europe, and its bite is supposed by the natives of Italy to be only cured by the patient being made to dance violently to the sound of music. It lives on the ground, generally under stones or in holes in the earth, and does not construct regular webs to catch its prey, but lies in wait for it, or issues forth on predatory excursions, rushing back to its hole when it has secured it. (*See* also SPIDER.)

TARSIER, *tar-se-er*, a curious gen. of monkeys allied to the Lemurs and Galagos. The Banca Tarsier (*Tarsius spectrum*) inhabits Borneo, Celebes, and the Banca islands. It is remarkable for its extremely long fingers.

TAXIDERMY, *taks'-i-der-me*, (Gr. *taxis*, arrangement; *derma*, skin,) a term originally used to designate the methods for preserving skins, so as to retain their natural appearance, but is now applied to the art of preserving the whole animal body for collections of natural history,—the method best applicable to the preservation of small quadrupeds, reptiles, crustacea, most of the insects, though not the lepidoptera, the skins of the larger animals, &c. The object to be preserved should, if small, be suspended in a glass jar containing alcohol; in the case of specimens of large size, copper cans, or wooden kegs, made with a large mouth, with a cap or bung fitting air-tight. The vessels should be completely filled with alcohol, in order to prevent injury by motion. Insects are commonly preserved by fastening them down with pins thrust through their bodies, into a lining of cork or soft wood, forming the bottom of paper boxes. As collected, they may be placed in small wide-mouthed phials, containing a little camphor, or, better still, a sponge soaked in ether, which soon kills them. Large animals should be skinned, and the skins placed in alcohol, or smeared on the inside with arsenic, and then dried. If arsenic cannot be procured, immersion in a strong brine of alum and salt is very efficacious. A wash with a solution of corrosive sublimate in water is an admirable preservative, and will defend skins, furs, and feathers against the ravages of the white ant. Insects are kept from the skins by sprinkling in the hair powdered green or blue vitriol. The skins should be stripped from the animals with especial care. Before setting up in the natural position, with wires, &c., all parts liable to decomposition should be carefully removed, and arsenic or arsenical soap applied freely over the skin. The arsenic may be applied either in a state of dry powder or mixed with alcohol and water to the consistency of treacle, and applied with a brush. For detailed directions for the preservation of every specimen of natural history, consult Swainson's *Taxidermy*, forming a volume of Lardner's *Cabinet Cyclopædia*.

TAYRA, *tai-rah*, a handsome weasel of tropical America, (*Galera barbara*,) which is almost as large as the Pine Marten, and is black, with the exception of a large white patch on the breast.

TEAL, *teal*, (*Querquedula crecca*,) (Du. *taling*,) a bird belonging to the family *Anatinæ*, or true ducks, the characteristics of which are given in a former article. It is the smallest of the wild ducks which visit this country in the winter, and has a black bill, with the head and upper parts of a bright bay colour. It arrives in this country very late in the autumn, and is found principally along the southern and westward coast of England and Ireland.

TEARS, *teerz*, (Lat. *lachrymæ*,) in Phys., are the limpid fluid secreted by the lachrymal glands, and flowing on the surface of the eyes. They serve to prevent the friction of the eyelids on the eyes, to keep the cornea moist, and to wash away any extraneous bodies that may have fallen into the eye. (*See* EYE).

TEE-TEE, a name given to several of the Squirrel-monkeys, *Callithrix*, *q. v.*

TEETH, *teeth*, (Sax. *teth;* Lat. *dentes;* Gr. *odontes*,) in Anat., are certain hard bodies attached to parts of the mouth or beginning of the alimentary canal, and peculiar to vertebrated classes of animals. They are principally adapted for seizing, tearing, dividing, pounding, or grinding the food; but in some they are modified to serve as weapons of offence and defence; in others as aids to locomotion, means of anchorage, instruments for uprooting or cutting down trees, or for the transport and working of building materials. They are characteristic of age and sex; and in man they are also subservient to beauty and speech. In man every tooth consists of two hard parts; one external, white, uniform, somewhat like ivory; the other internal, somewhat like the compact structure of bone. The former, which is armed enamel, is very close in texture, perfectly uniform and homogeneous, yet presenting a fibrous arrangement. It is seen only at the crown of the tooth, the upper and outer part of which consists of this substance. The internal portion of the tooth and the root consists of close-grained bony matter, as dense as the compact walls of the long bones. In the interior of the bony part of each tooth is a cavity, which descends into the root and communicates at its extremity with the outer surface by openings corresponding to the number of branches into which the tooth is divided. This cavity, which is large in young or newly-formed teeth, and small in those which are old, contains a delicate vascular membrane, which has been named the pulp of the tooth. It presents two surfaces,—an exterior, adhering to the bony surface of the dental cavity by minute vessels, and an interior, free, and, so far as can be determined of a body as minute, resembling a closed sac. In the child, the teeth usually begin to cut through the gum about the sixth or seventh month after birth, and the temporary or deciduous set of teeth, twenty in number, are generally completed by the end of the third year. The period of dentition is usually a time of disordered health to children, especially if anything occurs to prevent the ready yielding of the gum to the pressure of the tooth below. The deciduous teeth begin to fall out about the age of seven or eight, and are replaced by the adult or permanent set. These are thirty-two in number, or sixteen in each jaw; namely, four incisors or front teeth, two cuspidati or canine teeth, four bicuspidati, and six molars. The last two molars are called *dentes sapientiæ*, or wisdom teeth, on account of their not making their appearance till about the age of eighteen or twenty, or later, when one is supposed to have reached the years of discretion. The teeth are subject to decay, and require to be kept clean by frequent brushing. (*See* TOOTHACHE.)

TEGUEXIN, *teg-wex'-in*, a large American lizard, (*Teins*,) measuring more than five feet in length, and having a very long tail. There are several species of Teguexins, all of which can swim well, and plunge into the water if alarmed. It is a powerful animal, and, if brought to bay, will fight fiercely, biting like a bull-dog, and retaining its hold nearly as tenaciously. The scaly rings with which its tail is covered are thought to be useful as a protection against paralysis. The fat is also valued by the natives, who apply it to wounds, and think that it has the power of drawing out any thorns or prickles that have become buried in the flesh. The animal itself is believed to give notice of the approach of the alligator by hissing angrily. On the banks of the Amazon it is called Jacuarii.

TEIUS. (*See* TEGUEXIN.)

TELEDU, *tel'-ĕ-doo*, a Javanese animal, (*Mydaus meliceps*,) that is popularly called the Stinkard, on account of the horrible stench which it can produce when alarmed. It belongs to the weasels, and is allied to the equally odorous skunk of North America. Its colour is dark brown, except a broad stripe of white along the back. The small amount of fetid matter which can be ejected by a teledu is so potent, that a whole village can be affected by it.

TEMPLES, (Lat. *tempora*, literally *times*,) in Anat., are the lateral and flat parts of the head above the ears; so called because time, or the age of an individual, is denoted by the hair becoming first gray here. The temporal bones are two irregular-shaped bones, one on each side of the head, connected with the occipital, parietal, and sphenoid bones. The temporal muscle is situated in the temple, and inserted into the coronoid process of the lower jaw, its principal use being to draw the lower jaw upwards, as in biting. The temporal artery is a branch of the external carotid, which runs on the temples and gives off the frontal artery.

Tench, *tensh*, (*Tinca vulgaris*,) a common and well-known fish in these islands, belonging to the Carp family, or *Cyprinidæ*. Like the carp, the tench is extremely tenacious of life. It is distinguished, in common with the family, by having no adipose dorsal fin, a scaly head, and a small mouth destitute of teeth. (*See* Carp.)

Tenebrio. (*See* Mealworm.)

Teredo, *ter-ee'-do*, a destructive mollusc, popularly called the Shipworm, which bores holes into timber and destroys vessels, piles, or any other submerged wooden structure, by boring so many holes, that the wood looks as if it were a honeycomb. The copper with which the bottoms of ships are covered is the only protection that has as yet proved effectual.

Terns, *turnz*, a large group of marine birds, allied to the gulls, but distinguished by their long, pointed wings, and their forked tails.

Terebella, *ter-ee-bel'-lah*, a gen. of marine worms, which make gelatinous tubes, strengthened with sand, fragments of shells, and other substances. They have a great bunch of delicate tentacles, by which the materials for the tube are gathered.

Termite. (*See* Ant, White.)'

Terrapins, *ter'-ră-pins*, a group of aquatic tortoises found in America, which have long necks and powerful jaws. Their flesh is excellent, and they are sold in the markets for the purposes of the table. Many genera of tortoises furnish species that are called terrapins, such as *Chelydra*, *Malaclemys*, *Kinosternon*, &c.

Terrier, *ter'-re-er*, (Fr., fr. Lat. *terra*, earth,) a small variety of domesticated dog or hound, so called from its propensity to pursue and attack its prey in subterranean retreats. If not indigenous in England, it was very early introduced by the primitive inhabitants. Even a considerable mixture with other breeds does not impair its boldness, hardiness, fidelity, vivacity, and vermin-hunting propensities. There are two well-marked varieties, the result of fancy or accident. One, the English terrier, is smooth, round, elegant in shape, usually black, with tan spots over the eyes, and the same tint on the legs and the lower parts; it is occasionally white; the nose is sharp, the eyes bright, ears pointed or slightly turned down, and the tail carried high and bowed over the back. The other, the Scotch terrier, the oldest and purest breed, has shaggy and wiry hair, a shorter and fuller muzzle, bearded snout and face, stouter limbs, less elegant form, and a pale sandy or ochre colour. The terrier has an acute sense of smell, and is a good attendant on a pack of hounds, forcing foxes and other game from their coverts and dens. In England the terrier blood is visible in most sheep and cattle dogs. The Maltese terrier is a species of dog about the size of a ferret or weasel, found in Malta and other islands in the Mediterranean, generally a great favourite with ladies. They are very faithful and affectionate to their owners, while they are very ill-tempered towards strangers.

Testudo. (*See* Tortoise.)

Tetracerus. (*See* Chikara.)

Tetrao. (*See* Grouse.)

Textor. (*See* Weaver-birds.)

Thalarctos. (*See* Bear, Polar.)

Thalassidroma. (*See* Petrels.)

Thigh, *thi*, (Sax. *thegh*, Lat. *femur*,) in Anat., is that part of the upper extremity between the lower part of the trunk and the leg. It is articulated to the pelvis, and to the bones of the leg at the knee. The thigh-bone is the longest of all the bones of the body, and consists of a body or shaft and two extremities. The body is compressed, but nearly cylindrical towards the centre, and expands superiorly and inferiorly. At its superior extremity is the neck, which is directed upwards and inwards, so as to form an obtuse angle with the shaft; and at its point of union with the latter are two eminences, called the trochanters. The neck is so called from its constricted appearance, as well as from its supporting the head. This last is globular, forming a considerable segment of a sphere, and in the fresh state is coated with cartilage. It articulates with the acetabulum, or cup-shaped cavity of the os innominatum, so as to admit of a variety of motions. The inferior extremity of the bone is much thicker and broader than the superior, and is terminated by two eminences separated posteriorly by a deep fossa, and named the external and internal condyles. The articular surfaces of both condyles are covered with cartilage, and are connected inferiorly with the tibia and anteriorly with the patella. This bone is well covered with muscles, and through the thigh pass large blood-vessels and nerves connected with the foot and leg. (*See* Anatomy.)

Thorax, *tho'-răks*, (Gr., from *thoreo*, I leap, because the heart leaps in it,) in Anat., is the chest, or that part of the body which is situated between the neck and the abdomen. It is composed of bones, cartilages, and ligaments, which form a large conical cavity for the lodgment of the heart, lungs, and large blood-vessels Its walls are formed posteriorly by the dorso-thoracic vertebræ and the ribs as far outwards as their angles, laterally by the bodies of the ribs, and anteriorly by the anterior extremities of the ribs, the sternum, and the costal cartilages. It is separated from the abdomen below by the diaphragm. The thoracic duct lies upon the dorsal vertebræ between the aorta and the vena azygos, and extending from the opening of the diaphragm to the angle formed by the union of the left subclavian and jugular veins, into which it opens and pours its contents. It is the great trunk of the absorbents, which pour their contents into it from almost every part of the body.

Thread-worm, or Filaria, *thred-wurm*, a gen. of worms belonging to the class *Entozoa*, ord. *Nematoidea*, so called from their form, which is long and slender, resembling that of the Gordii among the Annelida, but with mere marks on the body instead of rings. Their extremities are cylindrical and attenuated. They inhabit various animals, both large and small, while some are found in the subcutaneous cellular tissue of man; as the guinea-worm, *Filaria medinensis*, so common in hot climates, more especially on the coast of Africa, where the natives are infested with it. It penetrates the skin and raises a painful tumour, but may be easily extracted by seizing the extremity and drawing it a little way out, when the extracted portion is twisted round a small stick, which is rotated each day until the worm is pulled gradually out. Two other species are found in man, the one infesting the eye, and the other the bronchial tube. Birds, reptiles, and fishes, as well as insects and mollusca, are also subject to its attacks. Several species of ground beetles (*carabidæ*) are so infested with them, that the soonest mode of procuring the thread-worm is to kill a few beetles and open them. If the insects are killed by being placed in spirits, the thread-worms generally endeavour to escape, but die before they can quite liberate themselves.

Thrush, *thrush*, or **Throstle**, (Sax. *thrise; Turdus*,) a fam. of dentirostral birds, of the ord. *Insessores*. Thrushes, or birds bearing considerable resemblance to thrushes, are found in almost every part of the world. Those which inhabit high latitudes, and places which are otherwise very seasonal in their character, are in general migratory, and those which inhabit places of more mild and uniform character are in general stationary. The generic characters are,—beak of moderate size, straight, convex above; point of the upper mandible compressed, notched, and slightly curved downwards; the gape furnished with a few hairs, the nostrils oval, lateral, half concealed by membrane; middle toe not so long as the tarsus, and the outer toes joined to it at the base. As the number of species that has been described amounts to between 140 to 150, we can only give an outline of a few of them. The missel thrush (*T. viscivorus*) is one of the largest of the European species, measuring eleven inches in length and about sixteen or seventeen in the stretch of its wings. It is rather a shy bird, frequenting small woods and the high trees in hedges bounding large meadows, but during the breeding season it becomes bold and quarrelsome, driving away the smaller birds in all directions from its haunts. It is resident in England all the year, and the male commences his song as early sometimes as February. It begins to build in April, and fixes its nest in the fork of a branch of a tree, frequently that of an apple-tree in an orchard. The external part is made of sticks, coarse vegetable fibres, moss, and an admixture of earth, and lined with finer vegetable matter and with wool. The eggs are of a greenish white, or sometimes of a reddish white colour, spotted with red-brown, and are four or five in number. The song thrush (*T. musicus*) is "the thrush" by way of eminence in England. In Scotland it is the *mavis*. It is considerably smaller than the missel thrush. The length is about nine inches, the extent of the wings about thirteen and a half. As is the case with the missel thrush, the general colour above is brownish gray, and that below whitish red, mottled with dusky spots. It frequents small woods, plantations, and shrubberies, and seeks its food in meadows, lawns, and gardens. In the grape countries of Europe it feeds luxuriously during autumn on ripe grapes, and at that time is in great request for the table. The nest is a compact structure, formed externally of moss and fibres, and strengthened with an admixture of mud. It is generally in the corner of a hedge or bush, or of a thick tree, but seldom at any considerable elevation above the surface of the ground. The eggs are usually four or five in number, of a beautiful light blue colour, with a few small well-defined black spots over the larger end. The song of the thrush is very sweet, and has considerable compass. The solitary thrush (*T. solitarius*) has also been called the blue thrush, from its colour. It inhabits the mountainous parts of the south of Europe. The general colour is blue, with gray margin to the feathers, the size rather smaller than the common blackbird, but the habits a good deal the same. The rock thrush (*T. saxatilis*) frequents the wildest parts of rocky countries, and is found in summer on the Uralian mountains, the Alps, and Pyrenees. It is a very shy bird, and makes its nest among fragments of rock or loose rough stones, of hair lined with moss. It is about seven inches and a half in length. (*See* Ant Thrushes. For Spotted Ground Thrush, *see* Cinclosoma.)

Thylacinus. (*See* Wolf, Tasmanian.)

Thynnus. (*See* Tunny.)

Thyroid Cartilage, in Anat. (*See* Larynx.)

Tibia. (*See* Leg.)

Ticks, *tiks*, (*Ixiodidæ*,) a species of minute animals of a parasitical nature, belonging to the general division *Acaridæ*. Ticks have the mouth shaped like a sucker, and they are found in thick woods hanging on low plants, and ready to attach themselves to the coats of horses, cows, dogs, and other animals which approach them. They bury their sucker deep in the skins of the animals they attack, and work their way down into the flesh, preying upon the blood. They attach themselves so firmly to the victims, and multiply so fast, that many horses and cattle often perish from exhaustion, on account of the blood of which they have been deprived. The ox-tick, (*Ixiodes reticulatus*,) when inflated with blood, is about half an inch long. The water-ticks (*Hydrachnidæ*) form another variety of the species, and live in the water always; but in habits and mode of life resemble the others in nearly every particular.

Tic-polonga, *tik-po-lon'-ga*, a venomous snake inhabiting Asia, and sometimes called the Katuka, (*Daboia elegans*.) The name polonga is given by the natives to many snakes, the prefix tic alluding to the spots with which it is marked. It is much dreaded by the natives. Its colour is brown, and there are three rows of brown spots edged with white running along the body.

Tiger, *ti'-ger*, (Lat. *tigris*,) (*Felis tigris*, Linnæus,) an animal which, like the lion, is considered to be a distinctive type of the family *Felidæ*. It is a most ferocious and bloodthirsty animal, and ranks next to the "king of beasts," although in ferocity it may be fairly considered his superior. There is only one species, and that is termed the *Royal tiger*. His colour is principally of a bright orange; his throat, face, and under portion of the body nearly white; and the whole surface of his coat banded with transverse stripes of a jet-black colour. Although somewhat less than the lion, the tiger is scarcely inferior in strength, while in the splendour of his coat and the general beauty of his form and appearance, he is greatly superior. He has no mane, and his average length is about eight or nine feet, while his height from the ground is between three and four feet. Some specimens have occurred of from eleven to twelve feet in length, and of proportionate height; but the dimensions above given may be taken as the average size of the generality of the animals. In strength and activity the tiger exhibits the most stupendous powers. The distance he clears in his bound, and the wonderful celerity with which he accomplishes it, is marvellous, and hardly any beast, even the elephant, can resist the impetus of his attack. He can carry off a man with ease in his mouth, and has been seen to drag away a large buffalo apparently without effort. Tigers are not found on the African continent, but they abound in India, and are found in China; while in Sumatra, even at the present day, they exist in such large numbers that they are a positive scourge to the natives, whole villages being depopulated by their ravages, and all the cattle in the neighbourhood destroyed. In India, however, the largest varieties are found; and there, as well as in Sumatra, the superstitious natives worship him through fear. Sir Stamford Raffles, the eminent naturalist, gives various accounts of the superstitious fears of the natives in reference to the tiger. He mentions that while he was in Sumatra, "one of the villagers, in the vicinity of Bencoolen, told me that his father and grandfather were carried off by tigers; and there is scarcely a family that has not lost some of its members by them. In many places the inhabitants appear to have resigned the dominion to the tigers, and take few precautions against them, regarding them as sacred. The natives hold the transmigration of souls, and call the tiger their *nene*, or grandfather, upon the supposition that the souls of their ancestors are dwelling in the tigers. On the banks of one of the rivers, above a hundred persons were devoured by the tigers in a single year. When the tigers enter a village, the people prepare rice and fruits, and place them at the entrance, supposing that the tigers will be pleased with this hospitable reception, and pass on without doing them any harm." In a volume lately published by a celebrated Anglo-Indian hunter, termed "The Hunting-Grounds of the Old World, by the Old Sheckary," it appears that this superstitious regard for the tiger by the natives has not by any means died out, but is still as common as ever. In India, hunting the tiger is a very popular sport, and has done much good, by partially getting rid of the animal; for as the European dominion has become extended, the race of tigers has proportionately decreased. The sport is carried on principally by hunters mounted on elephants, as no horse will face the tiger even on coercion. Formerly the East India Company offered about ten rupees, *i.e.*, forty shillings, a head for every tiger killed. For CLOUDED TIGER, *see* RIMAU DAHAN.

TIGER-BEETLES, (*Cicindela* or *Cicindelidæ*,) a gen. and fam. of coleopterous insects, remarkable for their rapid and vigorous flight. They are generally found in dry meadows, sandy plains or heaths, and on the banks of rivers. The common green tiger-beetle is a very beautiful insect, being, as its name implies, of a bright grass-green colour, having five small round cream-coloured spots to mark the *elytra*, black and prominent eyes, with head, thorax, and limbs, which are long and slender, of a rich gilded cast. It is also notable for a powerful and fragrant odour, much resembling the perfume of a crushed verbena leaf. This odour is enduring, and cannot easily be removed by washing. The larvæ live in perpendicular burrows, from which only their heads and jaws protrude, and they feed upon the unfortunate insects that pass within reach.

TIGER-CAT. (*See* CAT.)

TIGER-MOTH, the type of the *Arctiidæ*, a fam. of nocturnal insects, belonging to the *Lepidoptera*. The common tiger-moth (*Arctia Caja*) is a very beautiful insect, measuring about three inches across the expanse of its fore wings, which are of a rich brown colour, with numerous irregular strokes and spots of creamy white; while the hind wings are of less size, and are diffused with bluish-black spots. The larvæ of these insects are covered with thick long hair, and present a most peculiar appearance. The *Arctia chrysorrhœa* is another variety, and its larvæ are very destructive to trees, particularly fruit-trees. They are gregarious, and sometimes appear in large numbers, so as to really become a minor plague. It is mentioned that in the year 1782 they were so very destructive about the neighbourhood of London, that subscriptions were opened in the metropolis for the purpose of employing the poor in collecting their webs; and it is asserted that no less a quantity than eighty bushels of them were collected and burnt in the parish of Clapham in one day.—*Ref.* Baird's *Dictionary of Natural History.*

TIKUS. (*See* GYMNURA.)

TINCA. (*See* TENCH.)

TINEIDÆ, *ty-nee'-id-ee*, a vast family of moths, all of small size, and many very destructive. Many of the caterpillars which roll leaves belong to this family, and the type of the family is the well-known clothes-moth, *Tinea vestiaria.*

TIPULA. (*See* CRANE-FLY.)

TISSUE, *tis'-shoo*, (Lat.,) in Anat., texture, or organisation of parts. The peculiar intimate structure of a part is called its *tissue.* A part of a fibrous structure is called a *fibrous tissue.* The organs of the body are made up of simpler elements, some generally diffused through the body, and others peculiar to particular organs. These simpler structures are called the *tissues* of the body; as the cellular *tissue*, the mucous *tissue*, &c. The *cellular tissue* is the cellular membrane.

TISSUE, ADIPOSE. (*See* ADIPOSE TISSUE.)

TISSUE, EPIDERMAL. (*See* EPIDERMAL TISSUE.)

TITS, TITMICE, *tits*, *tit'-mise*, are a sub-fam. of birds belonging to the dentirostral tribe of the ord. *Passeres* and fam. *Luscinidæ.* They are distinguished by short conical bills, which have their tips entire, and their base covered with a few short stiff bristles. The wings are short and the tail long; the tarsi rather long and thick; the inner toe the shortest; and all the toes furnished with strong curved claws. The titmice are active little birds, and are commonly known in England under the names of tits, titmice, and tomtits, and many are distinguished for the beautiful colour of their plumage. They inhabit principally countries abundant in wood, and they feed on the insects and larvæ which they find on the bark and leaves of trees and shrubs. In this pursuit they exhibit their gracefulness and activity to great advantage, and may be seen clinging round the branches and twigs of trees in the most sprightly manner. There are seven species known in

Great Britain, of which the largest is the great tit, (*Parus major*,) which is about five inches in length. It frequents houses, and is said to be very mischievous to thatched houses, as it pulls out the straw in pursuit of insects and grain. It is also said to kill birds even bigger than itself, in order to feed on the brains, which it obtains by splitting their skulls by repeated strokes of its own little beak. The blue tit (*Parus cæruleus*) is another variety, and is so termed from the colour of its plumage. It builds its nest in the hollows of trees, and when disturbed by men, makes a buzzing noise and pecks at the intruder, whence it has attained its name of "Billy Biter" in some counties, as mentioned by Mr Yarrell. Besides these, there are the crested tit, (*P. cristatus*,) the coal-tit, (*P. ater*,) the marsh tit, (*P. palustris*.)

Toad, *toad*, (Sax. *tade*,) a tailless Batrachian reptile, belonging to the gen. *Bufo*. It is harmless, and resembles the frog, but is less active. The frog leaps, the toad crawls. The toad feeds upon insects, flies, ants, &c. ; it is preyed upon by owls, buzzards, snakes, &c. ; otherwise the toad attains to a considerable age, some remarkable instances of which have been recorded. There are very many species of toad, two of which inhabit our own country, namely, the common species and the natterjack. (*See* Frog.)

Toad-fish. (*See* Angler.)

Tody, *toad-i*, a name for a group of fissirostral birds inhabiting tropical America and Java, and remarkable for the brilliant hues of their plumage.

Tongue, *tung*, (Sax. *tung*,) in Anat., an organ found in most animals. The human tongue is a soft fleshy viscus, situated interiorly in the cavity of the mouth, very movable in every direction, and constituting the organ of taste, (*which see*.) Its movements are chiefly subservient to speech, and the prehension and swallowing of food ; and besides taste, it is also highly endowed with the sensation of touch. The sensitive power of the tongue resides in the membrane which covers it, the motor power in the interior. Indeed, almost the entire substance of the tongue is composed of muscular fibres running in different but determinate directions, many of which belong to muscles which enter at its base and under surface, and attach it to other parts. Hence the great variety and regularity of its movements, and its numerous changes of form. Between the several layers and bundles of muscular fibres, there is always found a considerable quantity of soft fatty tissue, and also a very fine areolar web. It is abundantly supplied with arteries, veins, and nerves, the last being,—(1.) the lingual or gustatory branch of the fifth pair ; (2.) the sublingual branch of the glosso-pharyngeal ; and (3.) the hypo-glossal nerve. The upper surface of the tongue is covered all over with numerous projections or eminences named papillæ. Towards the tip and free borders they gradually become smaller, and disappear on the under surface. These are doubtless chiefly concerned in the special sense of taste, but they also possess in a very high degree that of touch.

Tonsils, *ton'-silz*, (Lat. *tonsillæ*,) in Anat., are two complex glands, situated one on each side of the fauces, between the anterior and posterior arches of the soft palate. In relation to the surface of the neck, the tonsil corresponds to the angle of the lower jaw, where it may be felt beneath the skin when it is enlarged. They are of an elongated oval form, usually about six lines in length, and four in width and thickness, but they vary much in size in different individuals. Each is composed of a number of smaller glands, and presents a number of orifices opening on the surface of the mucous membrane. The nature of the secreted fluid is not certainly known, but it bears a general resemblance to saliva, and doubtless serves a similar purpose. The tonsils are largely supplied with blood-vessels and nerves.

Tooth. (*See* Teeth.)

Topknot Pigeon. (*See* Lopholaimus.)

Torpedo, or **Electric Ray**, *tor-pe'-do*, (*Torpedo gymnotus*,) a fish belonging to the *Raiidæ*, or Ray fam., a gen. of fishes belonging to the ord. *Chondropterygii*, or cartilaginous fishes, the characteristics of which are given under a former article. (*See* Ray.) The name of this fish is derived from the Latin, and signifies a numbness or torpor, and was given in consequence of the electric shock which the fish diffuses through any one who touches it. The torpedo inhabits the Mediterranean and other European seas, and is not unfrequently found on our coast, especially on sandy bottoms, in which it buries itself by the flapping of its tail and fins. The torpedo, like the skate, is a flat fish, and it is sometimes mistaken for that by many people, who are much discomfited on touching it. The body is more rounded than that of the skate ; the skin is smooth, and of a dark-brown colour above, and light beneath ; and the tail is short, with the dorsal fins placed in close proximity. The electrical apparatus with which this creature is endowed is formed of two organs lodged on either side of the head, and encompassed by the gills and the anterior border of the pectoral fins. Cuvier describes these organs as composed of little membranous tubes, placed close to each other, like a honeycomb, and subdivided into minute cells, abundantly supplied with nerves, which branch off in all directions. Each organ is about five or six inches in length, and three or four inches in breadth. All the perpendicular columns of which they are composed pass through the fish from the upper to the under surface of the body. In the Museum of the College of Surgeons there is a beautiful series of wax models illustrating the electric apparatus of the torpedo. The electric apparatus of the electric eel is arranged upon the same principle, though not quite in the same method. It is reported that an Italian physician, of the name of Redi, was the first to discover the electric power of the torpedo. On once seizing this fish, and grasping it with his hand, he felt a pricking sensation, which, extending along the arm to the elbow, and from thence to the shoulder, which was followed by a sort of trembling of the muscles, and a sharp oppressive pain in the elbow, which caused him instantly to drop the fish. Each time he touched it, the same sensation returned, but in a less degree after each shock, till at the end of three hours, the fish died, and the electric power of course ceased to exist along with it. It has been ascertained that the power of this fish is of a purely electrical character, as repeated shocks have been obtained from it by precisely the same means as we should employ to receive the shock from a galvanic battery or an electrifying machine; that is, it is carried on by means of regular conductors, and the contact of bodies with them. Forty or fifty shocks have been given in this way by the torpedo in the space of about two minutes; each shock being produced by an evident effort on the part of the fish, with marked depression of the eyes, which sank in their orbits as the shock was given, though at other times they were prominent enough. The fishermen call the torpedo by various names, such as the cramp-fish or numb-fish, and are fond of playing off a practical joke upon an ignorant comrade by putting the torpedo in a tub with other fish, and asking him to take it out. Several species of Torpedo are known.

TORTOISE, *tor'-tus*, a reptile belonging to the fam. *Testudinidæ*, and ord. *Chelonia*, a gen. of reptiles belonging to the section *Cataphracta*, or shielded animals. The shell of the tortoise is solid, thick, and covered, in the adult state, with horny plates. The feet are short, stout, and somewhat clubbed, and the toes are almost entirely concealed under the skin; and are terminated by bent nails, of which there are generally five upon each of the anterior, and four upon each of the posterior feet. In form, the head is rather small, and is covered with studs, and the jaws are horny, and are destitute of lips. The head, limbs, and tail can be completely retracted within the cavity of the shell; and consequently the tortoise can bid defiance to a good number of its enemies, with the exception of man. Most of the species are inhabitants of warm climates, and those which do exist in colder regions always burrow in the ground, and remain in a lethargic state during the winter. In habits, the tortoise is a great cumbersome animal, and is remarkable for its longevity and tenacity of life. Its food is purely vegetable, and its movements slow and awkward in the extreme. The tortoise is a terrestrial animal, although some species live when immersed in the water. The common tortoise (*Testudo græca*) is a native of the south of Europe, although it is found more abundantly in Greece than in any other parts of the Mediterranean. It is from six to eight inches long, and weighs about three pounds. The largest variety is the Indian tortoise, (*Testudo indica*,) which often attains a length of three feet. It is a native of India, and is very abundant in the Galapagos Islands. The flesh of the Indian tortoise is said to be very delicate, and the natives employ it largely, both salted and when fresh. A very thin oil is likewise obtained from its fat. It may be mentioned, in conclusion, that many fossil varieties of the tortoise have been found in this country in the red sandstone, where their footprints have been discovered also. A gigantic species, too, has been discovered in India in the tertiary formation. It has been termed the *Colossochelys Atlas*, and measured probably about 16 feet in length.—*Ref.* Dallas's *Animal Kingdom.*

TOTA. (*See* GRIVETS.)

TOTANUS. (*See* SANDPIPERS.)

TOUCANS, *too-kans*, *Rhamphastidæ*, a group of tropical American birds, belonging to the order of Scansores, and remarkable for their enormous bills. The beaks of these birds are brilliantly coloured, and in some species the most beautiful tints of green, scarlet, orange, chocolate, yellow, and black are to be found. They feed upon various substances, but insects and fruit seem to be their natural diet. There are many species of Toucans, and admirable figures and descriptions are given in Gould's magnificent monograph on these birds.

TOXOTES. (*See* ARCHER-FISH.)

TRACHEA, *trak'-ke'-ă*, (Gr. *tracheia*, from *trachus*, rough,) in Anat., is the cartilaginous and membranous canal through which the air passes into the lungs, commonly known as the windpipe. Its upper part is called the larynx, the uppermost and smallest part of which is called the epiglottis, being placed over the glottis, or mouth of the larynx, and serving to close the passage to the lungs in the act of swallowing. (*See* LARYNX.) From the lower end of the larynx the canal takes the name of trachea, ór *aspera arteria*, and extends as far down as the fourth or fifth vertebra of the back, where it divides into two branches, which are the right and left bronchial tubes. Like the larynx, it is formed of cartilages, united to each other by means of very elastic ligamentous fibres. It is also furnished with fleshy or muscular fibres, some of which pass through its whole extent longitudinally, while others are carried round it in a circular direction; and hence it may shorten or lengthen itself, or contract or dilate its passage. Thus a passage for the air is constantly kept open, and we are enabled to receive and expel it in greater or less quantity, or with more or less velocity, as in singing and declamation. It is supplied with a great number of small glands, which discharge a mucous fluid on its inner surface.

TRACHURUS. (*See* MACKEREL HORSE.)

TRACHYPTERUS (*See* RIBBON-FISH.)

TRAGELAPHUS. (*See* BOSCH-BOK.)

TRAGOPAN, *tray'-go-pan*, a beautiful bird of Nepaul, allied to the turkey, (*Ceriornis.*) The plumage is spotted, and two fleshy protuberances hang from behind the eyes. When the bird is excited, it can erect these protuberances until they look like a pair of horns. A large wattle hangs at either side of the lower mandible.

TRAGULUS. (*See* KANCHIL.)

TREPANG, *tre-pang.* Popular name for the various species of Holothuridæ, or sea-cucumbers, which are eaten by the Chinese, and collected for the Chinese market. Some species are so valuable that they are worth eight or nine shillings a pound when dried. They belong to the Echinodermata.

TRICHEOUS. (*See* WALRUS.)

TRIGGER-FISH. (*See* BALISTES.)

TRILOBITE, *tri'-lo-bite*, (Gr. *treis*, three, and *lobos*, lobe,) an extensive family of the palæozoic Crustaceans, deriving their name from the obvious three-lobed-like aspect of their bodies. The trilobites, in numerous generic forms, as *asaphus*, *ampyx*, *calymene*, *homalonotus*, *ilænus*, &c., are especially characteristic of the Silurian system. About a dozen genera range through the Devonian epoch; only three or four appear in carboniferous strata; and not a single specimen has been found in later formations.

TRIGLIDÆ, *trig-glĭdæ*, a gen. of Acanthopterygian fishes, popularly called gurnards, and including a vast number of species.

TRINGA, *trin-gah*, generic name for the curlew and stints, of which there are many species, several of which are common in England.

TRINGOIDES. (*See* SANDPIPERS.)

TRITON. (*See* NEWT, *also* CONCH.)

TROGLODYTES. (*See* CHIMPANZEE and WREN.)

TROGON, *troh'-gon*, a generic term for a lovely group of birds, most of them natives of tropical America, but some inhabiting Africa. They belong to the *Fissirostes diurnæ*. The most magnificent species is the Resplendent Trogon, (*Calurus splendens*,) which is scarlet below and green above, and is remarkable for the long and slender plumes which hang over the tail, and attain a length of three feet.

TROOPIALS, *tru'-pi-als*, a group of birds allied to the Orioles; the cow-bird, blue bird, and Bob-o-link of America, belong to this group.

TROPIDORHYNCHUS. (*See* FRIAR-BIRD.)

TROUT, *trowt*, (Sax. *truht*,) the name applied to a fam. of fishes belonging to the sub-gen. *Salar*, of the fam. *Salmonidæ*. The only distinctive feature which separates this fish from the remainder of the *Salmonidæ* is the fact of its possessing two rows of teeth in the vomer, instead of having nine, as in the genus *Salmo*. The common trout (*Salmo fario*) is a well-known fresh-water fish, which inhabits the rivers and lakes of Europe. It is a fish greatly prized by anglers on account of its being very shy at taking bait, and being excellent for the table. Specimens have been taken which have been more than two feet long, and exceeding fifteen pounds in weight. Like the salmon, it deposits its ova in a hole or nest in the sand at the bottom of the river. It is a shorter and stouter fish than the salmon, and the colour of its back is a yellowish-brown, its sides yellowish, which verges into a glossy-white on the belly. The back is also yellowish brown, and the sides are spotted with bright red, giving it a very pretty appearance. The gray trout is in larger quantity than the former, but its flesh is considerably inferior in quality. It is termed the *Salmo ferox*. (*See* also SALMON.) Another species is the salmon trout, (*Salmo trutta*,) which is, like the salmon, an annual emigrator.

TRUFFLE. (*See* TUBER.)

TRUMPET, SEA. (*See* CONCH. Also BELLOWS-FISH.)

TRUMPETERS, *trum'-pe-ters*, a small group of birds belonging to the herons, (*Psophinæ*,) remarkable for the trumpet-like notes which they utter. The *Ceriama* belongs to this group. They inhabit tropical America.

TRYGON. (*See* RAYS.)

TUNICATA, *tew-ni-kay-ta*, a group of marine molluscs which have no shell, but are wrapped in a soft and elastic tunic, which is called the "test." It embraces the sea-squirt, (*Ascidia*,) the sea-grapes (*Botrylli*,) and the *Salpæ*, the *Pyrosoma*, and a host of other creatures.

TUNNY, (*Thynnus thynnus*,) an Acanthopterygian fish of the family *Scomberidæ*, and allied to the mackerel. It is found in vast numbers on the shores of the Mediterranean, and is an important article of food. It is caught by a complicated series of nets, called the madrague, in which the fish are hunted from one division into another until they reach the last, which is called the chamber of death. There is a floor of netting to this chamber, so that the fish cannot possibly escape. It is a large fish, reaching six and seven feet in length. Its food consists of other fish. The flesh of the tunny is eaten fresh, and pickled like pork. The Albacore (*Thynnus pacificus*) belongs to this genus, and is useful to sailors, because it supplies them with fresh meat. The bonito is closely allied to the tunny.

TUN-SHELL. (*See* DOLIUM.)

TUPAIA, *teu-pay-yah'*, a remarkable insectivorous mammal of Sumatra and India. The Tupaia pursues its prey among the branches of trees, and has a very prolonged muzzle, which it can insert into small crevices. Its fur is yellowish-brown, and it has a long, flat, and bushy tail.

TURBOT, *tur'-bot*, (Fr.,) (*Rhombus maximus*,) the name of a fish belonging to the gen. *Rhombus*, of the fam. *Pleuronectidæ*, (Gr. "side-swimmers,") of the ord. *Anacanthini*, or those which have no spines in the fins. The family are generally known by the name of flat-fish, and are rendered peculiar amongst vertebrated animals from the fact of both eyes being placed on one side of the head, which side is always uppermost when the fish is swimming. The body of the turbot is very compressed, and is of a brown colour, and beset with tubercles, which, indeed, seem to distinguish it from the brill, and which it much resembles. A long dorsal fin fringes the whole extent of the back, and the under surface of the body is white. The turbot is found generally in deep water along our coasts, and its flesh is much esteemed for the table; consequently its fishery is an object of some importance to the maritime population. The number brought to the London market alone every season exceeds, on an average, 88,000, and it is said by Dr Baird, that a sum of £15,000 is annually paid to Denmark for lobsters in order to make sauce for them. They are caught by means of hooks and lines, and by trawl-nets, during the warm months of the year. Mr Yarrel mentions that the largest he has ever heard of measured about six feet across, and weighed about 190 pounds. The halibut, another species of turbot, greatly exceeds these proportions, many specimens of which, exceeding 300 pounds in weight, having been taken. —Dallas's *Animal Kingdom*.

TURDUS. (*See* THRUSH.)

TURKEY, *turk'-e*, (*Meleagris*,) a gen. of birds belonging to the ord. *Gallinæ*, fam. *Phasianidæ*, and sub-fam. *Meleagridæ*. The type of the genus is the well-known common turkey, *Meleagris gallopavo*, which has been proved by the eminent naturalist, Mr Gould, to be of Mexican origin, and to be the true parent of our common domestic species. Bonaparte, in his "History of American Birds," has given us a very forcible description of the turkey in its wild state. He mentions that when full-grown, the male wild turkey is nearly four feet in length, and about five feet in extent from wing to wing, while the colour of the feathers is of dark gray, and other colours, bordered on the edges with gold and similar vivid hues, presenting a splendour of plumage which we look in vain for in the domestic turkey. The wild turkeys do not confine themselves to any particular species of food, eating anything which comes across their path,—mice, all sorts of berries, fruits, grapes, beetles, tadpoles, and even young frogs and lizards, being found in the crops on dissection. They are particularly

TITLARK.

BENGAL TIGER.

fond of acorns, however; and when a large crop of these is produced in any part of the country, there will the wild turkeys be found congregated in immense numbers. The month of October is termed, in fact, amongst the Indians, the "turkey month," from the fact of their assembling in considerable flocks in order to gather the mast from the trees. The males are termed gobblers, and associate together in flocks of from ten to a hundred, and seek their food separately from the females, who also go in families by themselves. These latter are always intent on avoiding the old males, which always kill the young turkeys whenever they can get hold of them. All parties, however, travel in the same direction, and their migrations present the most extraordinary effect. When about to cross a river, they ascend to the greatest eminences, that their transit, which is by flight, may be more safely and speedily accomplished across; but before commencing their flight, they wait a day or two, apparently in deliberation and consultation; during which time the young males gobble and strut about, evidently all trying to animate their companions before setting out. At last, when every point has been settled, and their courage wound up to a proper pitch, the assembled multitude mount the highest trees, and, at a given signal from their leader, they wing their way across the opposing stream. When the turkeys have arrived in the land of abundance, they disperse in small parties, composed of all ages and sexes intermingled, devouring all the mast from the trees as they advance. This happens about the middle of November. After those long journeys, they become so familiar as to venture on the plantations, and even enter the stables and corn-ricks of the proprietors in search of food. In this way they pass the autumn and part of the winter, during which season great numbers are killed by the inhabitants, who preserve them in a frozen state in order to transport them to distant markets. Early in the month of March they begin to pair, and the noise they then make is something extraordinary. The sexes roost apart, but at no great distance; so that when the female utters a call, every male within hearing responds, rolling note after note in rapid succession, in a tone resembling that of the domestic turkey, when an unusual sound reaches its ear. Where the turkeys are numerous, the woods, from one end to the other, sometimes for hundreds of miles, it is said, resound with the remarkable noise thus caused. At sunrise it ceases, and all descend from their perches. At this season, too, fearful battles take place between the males, and numbers are killed by this means. When the females begin to lay, they separate from the males, as the latter invariably break the eggs when in their power. The young turkeys grow rapidly, and in the month of August go into the forest, and get their own subsistence until the autumn, when they again congregate, and go through their migration in search of the mast. The domestic turkey, in this country, is a stupid heavy bird, and is so well known as hardly to call for any special description. The name of the turkey is said to have been given to it from a mistaken opinion that it was a native of that country. The plumage is much inferior to that of the wild turkey, but by some authorities it is considered a handsome bird. Great numbers are reared in England, principally in Norfolk, whence large quantities reach the London market about Christmas-time. A second species of the turkey is found in Honduras, termed the ocellated turkey, (*Meleagris ocellata*,) which is much more brilliant in plumage than the common variety. It is nearly of the same size, but its feathers are of a beautiful metallic green, or bronze colour variegated with black, gold, and azure-blue. The Brush Turkey of Australia (*Tallegalla*) is not a true turkey, but belongs to another family called the *Megapodidæ* on account of their very large feet.

TURKEY BUZZARD, *tur-kee*, a bird belonging to the vultures, (*Cathartistes aura*,) so called because at a distance it bears a slight resemblance to a turkey. It inhabits North America and Jamaica, where it is popularly called by the name of John Crow. (*See* CATHARISTA.)

TURNIP-FLY, *tur'-nip*, (*Haltica nemorum*,) a well-known species of the *Galerucidæ*, a family of leaf-eating beetles. The turnip-fly is of very small size, and its colours very obscure. The body is of an elongated ovate form and very convex; the head is short and immersed in the thorax up to the eyes; the antennæ are short and filiform; the maxillæ bi-lobed at the apex, with the outer lobe jointed and palpiform; and the palpi short. It is a very destructive insect, and is named from the great injury it inflicts on turnip-fields, feeding on the interior of the leaves, where they take up their abode, and in fact undergo their transformation. In Devonshire it is stated that the effects of the ravages of this insect, in one instance alone, were estimated at £10,000 sterling; and another variety—the *Haltica oleracea*—inflicted such damage on the vines at Montpellier in one year that fears were entertained for the commercial prosperity of the town, and religious exercises were ordered in order to exorcise the insects. The striped cucumber-beetle, (*Galeruca vittata*,) an American species, inflicts great damage on the leaves of melons, cucumbers, and such-like plants, whereon it lives.—*Ref.* Baird's *Dictionary.*

TURNSPIT-DOG.—A variety that was once very commonly used for turning spits in large houses. At the end of the spit was a hollow wheel, into which the animal was put, and which he kept continually turning by performing the movement of walking. The body of this dog was long, the limbs short, and the fore-legs were knock-kneed.

TURTLE, *tur'-tl*, a reptile similar to the tortoise, and belonging to the fam. *Chelonidæ.* The body of the turtle is short, swollen, and enclosed in a case formed of two shields, united by their margins, and composed of a crust of imbedded plates, which leave the neck, limbs, head, and tail free. These parts are usually covered with a scaly skin. They have four legs, which are short and thick, and the tail is short and conical. They respire by means of lungs, at all ages, and are viviparous; and their brain and senses are but very indifferently developed. These characteristics are shared by the tortoises as well; but in the turtles the limbs are connected with fin-like organs, as their habits are purely aquatic. The turtle feeds on grass, sea-weed, and other marine plants, and in some instances on small mollusca. The female produces her eggs about the month of April to the number of one hundred or more, which she buries in the sand, where they soon become invigorated with life. The turtle is closely allied to the tortoise, and differs only in its specifically different habits and habitats. In their external appearance they bear a close resemblance to each other, except in size, in which the turtle greatly exceeds and outweighs the land animal. As to their habits, the tortoise readily takes to the water, and appears at ease in that element, especially in sultry weather, and the turtle, on the other hand, often comes on shore, and inhabits the warm sand on the sea-coasts, where it dwells when about to deposit its eggs. They consequently much resemble each other, and have been rightly classed by naturalists together, although one is essentially a terrestrial, and the other a marine reptile. As an article of food, however, the turtle is much prized, whereas the flesh of the tortoise is quite coarse and uneatable ; and this constitutes another distinction between them. The best known variety of the edible species of turtle is that termed the green turtle, (*Chelonia viridis*,) which is found in the seas of most warm climates, and of which large numbers are annually imported into Europe for the purposes of the table, no great banquet being considered complete without this dish making its appearance. This variety attains a length generally of five or six feet, and from five to six hundred pounds weight. The flesh of this turtle is peculiarly delicate, and the eggs are likewise esteemed a great dainty. They are generally taken by watching them when they come on shore on moonlight nights for the purpose of depositing their eggs, when their captors secure them by turning them on their backs, so that they cannot escape by running off. There is also the Leathery Turtle, or Luth, (*Sphargis coriacea*,) which is found in the Atlantic and Pacific oceans. As its name imports, it has a soft leather-like shell, and it may be known by the great length of the flappers. It reaches an enormous size, weighing eight or nine hundred pounds, but its flesh is not good for food. The eggs, however, which are several hundred in number, are edible, and are much sought after. The green turtle abounds in the West Indies, off the Bahamas, and at the island of Ascension, which latter place, in fact, seems to be their head-quarters. They are also often met with in the Atlantic, sometimes seven or eight hundred leagues from land, when they are easily captured when asleep on the surface of the water. The hawk's-bill turtle (*Chelonia imbricata*) is another variety, and does not attain so large a size as the one just described, seldom being found to exceed two hundred pounds in weight. This variety is found in the Atlantic, and also in the Indian Ocean, but it is not much thought of, as its flesh is very coarse and inferior to that of the green turtle. It is called the hawk's-bill turtle from the curved and pointed form of the upper jaw, which, however, presents but very little resemblance to the beak of any bird of prey. This turtle is much sought after for the value of its shell, which is converted into the best "tortoise-shell" of commerce. The largest species is termed the loggerhead turtle, (*Chelonia caretta*,) which is found in the Mediterranean Sea not unfrequently, besides the Atlantic and other tropical seas. This variety generally feeds on mollusca, and its flesh is consequently unfit for food, besides being highly poisonous. The shell, too, is not worth much, and the only thing which it is valued for is a large quantity of oil which it yields, and which burns very well in lamps. Some specimens of the loggerhead turtle have been found which exceeded sixteen hundred pounds, and some of between seven and eight hundred pounds weight have been found thrown up even on the coast of England. Allied to the turtles are the soft tortoises, which inhabit the rivers and lakes of Asia and Africa, and also the waters of North America. These are active animals, feeding principally on fish, but occasionally on birds and small reptiles. Of these the *Tryonix ferox*, or snapping turtle, is one of the most remarkable, as it destroys large numbers of young alligators in North America annually. They seize their prey by suddenly darting at their long neck and clutching it in their bite, which is very strong. The flesh of the snapping turtle is superior to that of any other of the varieties of the turtle known, and on that account it is much hunted. This species have their shells covered with a hard cartilaginous skin, usually expanded and flexible on the edge, and a long neck, which they can retract at pleasure under the carapace. They swim with much ease, and at night-time seek repose in quiet nooks, where they will be undisturbed. They are caught in North America by angling for them with a hook and line, baited with small fish, or any living animal. (*See* also TORTOISE.)

TURTUR, *ter'-ter*, generic name of the well-known turtle-dove.

TWEEY. (*See* MENOPOME.)

TYRANNUS. (*See* KING-BIRD, FLY-CATCHER.)

U.

UMBRELLA-BIRD, *um-brel'-lah*, a remarkable bird allied to the crows, (*Cephalopterus ornatus*.) It inhabits South America, and is seldom seen except on the banks of rivers. Its colour is deep shining blue-black, and it is remarkable for the crest of deep blue-black feathers which rises from the head and curves towards the end of the back, which it nearly reaches. There is also a very long tuft of similarly-coloured feathers pendent from the breast.

UPUPA. (*See* HOOPOE.)

URCHIN, SEA. (*See* ECHINUS.)

URIA. (*See* GUILLEMOT.)

URINE, *yu'-rin*, (Lat. *urina*,) is a highly complex fluid, secreted from the blood by the kidneys. In a healthy person, when recently voided, it is a clear limpid fluid, of a pale yellow or amber colour, with a peculiar, faint aromatic odour, which becomes pungent and ammoniacal when decomposition takes place. Often, however, as it cools, it becomes opaque and turbid, from the deposition of part of its constituents previously held in solution ; and this may be consistent with health. Healthy urine may, however, be nearly colourless, or of a brownish or deep orange tint, and may present every shade of colour between these extremes. The quantity secreted in twenty-four hours depends upon the amount of fluid drunk, and the quantity secreted by the skin;

but generally it is about from thirty to forty fluid ounces. Its specific gravity varies in health from 1·015 to 1·030; but 1·020 is the average standard. It is acid in its reaction, and contains some mucus and epithelium. In 1000 parts of ordinary urine there are 933 parts of water and 67 parts of solid matter. The following analysis is given of the solid contents of urine, but the proportion of the materials is liable to very great variation, depending on food, exercise, and other conditions:—Urea, 49·68; uric acid, 1·61; extractive matters, ammoniacal salts, and chloride of sodium, 28·95; alkaline sulphates, 11·58; alkaline phosphates, 5·96; phosphates of lime and magnesia, 1·50. Medical men distinguish three kinds of urine,—(1.) *urina sanguinis*, or that which is secreted from the blood at times when neither food nor drink has been recently taken, as in the morning before breakfast; (2.) *urina potûs*, or that which has been secreted after any considerable quantity of fluid has been taken into the body; and (3.) *urina cibi*, or that secreted during the period immediately succeeding a meal of solid food. The last of these contains a larger quantity of solid matter than either of the former, both of which are largely diluted with water. The first, or morning urine, is the best for analysis; it is from it that we are best enabled to learn the state of the kidneys, and the system in general.

URSON. (*See* PORCUPINES.)

URSUS. (*See* BEARS.)

URUBU. (*See* CATHARISTA.)

UVULA, *yu'-vu-lă*, (Lat. *uva*, a grape,) in Anat., is a small fleshy protuberance which hangs at the middle of the posterior margin of the soft palate. In the case of sore throat, it frequently becomes enlarged and inflamed, and is to be treated by the application of stimulants and astringents and gargles. When other means fail, it may be amputated, an operation neither painful nor dangerous.

V.

VADGMAR. (*See* RIBBON-FISH.)

VAMPIRE. (*See* BATS.)

VANELLUS. (*See* LAPWING.)

VAPOURER, *va-por-er*, a well-known British moth, belonging to the fam. Arctiidæ, (*Orgyia antiqua*.) The female of this moth is entirely without wings, and would not be recognised as belonging to the moths, except by a practised observer.

VEINS, *vains*, (Fr. *veine*, Lat. *vena*, a vein,) in Anat., are those organs of circulation by which the blood is taken up from the arteries and conveyed to the heart. (*See* CIRCULATION OF THE BLOOD.)

VELELLA, *vee-lel'-la*, a remarkable animal belonging to the Acalephæ. It has a flat, oval, membranous body, from which rises a rounded crest, which may possibly act as a sail. From its edge hang numerous appendages or tentacles, with which it seizes its prey.

VENDACE, *ven-dais*, a British fish, belonging to the ord. Chondropterygii, and to the family Salmonidæ. Its scientificn ame is *Coregonus Willoughbii*.

VERTEBRÆ. (*See* SPINE.)

VERTEBRATES, *vur'-te-braits*. Those animals which possess a spinal cord protected by vertebræ.

VERVET, *vur-vet*, a name for a small monkey of Senegal, (*Cercopithecus pygerythrus*,) allied to the grivet or green monkey, Diana monkey, and others of the same large genus. The tame monkey, which sits on a barrel-organ, and performs certain antics, is generally a vervet or a grivet.

VESPIDÆ, *ves'-pi-de*, is the scientific term applied to the Wasp fam. of insects. It is composed of aculeated hymenopterous insects, comprising the species of the Linnæan genus *Vespa*, and to which the wasps and hornets belong. (*See* WASP, and HORNET.) —*Ref.* Baird's *Cyclopædia of the Natural Sciences*.

VICUGNA, *vee-koo'-nyah*, one of the llamas, living in the high regions of northern Chili, and preferring the belt just below the line of perpetual snow. Its fur is very valuable. (*See* LLAMA.)

VIDUA. (*See* WHIDAW-BIRD.)

VIPER, *vi'-per*, (Lat. *vipera*,) the type of the *Viperidæ*, a fam. of poisonous reptiles belonging to the ord. *Ophidia*, or snakes. The *Viperidæ* consist of two sub-families; namely, the *Crotalidæ*, or rattlesnakes, which will be found treated of in their proper place, and, secondly, the true vipers of the Old World, which differ from the former by their not having pits in the sides of the face. The common viper known in Europe (*Vipera Berus*) is found in all countries, from the north of Russia and Sweden down to the shores of the Mediterranean Sea. As it is the only venomous reptile found in Great Britain, it is deemed worthy of some especial notice. In some parts of this country it is found in considerable numbers, inhabiting generally stony places, heaths, and other dry districts. Its length rarely exceeds two feet, although some specimens have been found of three feet, and it can be easily distinguished from the common snake, for which it is often indeed mistaken, by its broad head of triangular shape and short tail. Its colour is generally yellowish-brown, or olive-tinted, and marked with a double row of black spots; the sides are somewhat paler in the hue of their ground-colour, but possess the same markings as the back. The nose is bluntly shaped, and the eyes, small and brilliant, are bordered with black; the tongue is very long in comparison with the size of the body, and is protractile and forked at the extremity. Vipers are viviparous, bringing forth young instead of eggs; and their general food consists of young birds, field-mice, worms, insects, shrews, and suchlike small animals. Although the poison of the viper is less virulent in its nature than is the case with similar reptiles found in warm countries, yet it is often attended with the most alarming effects, ending sometimes even in death. When it is about to inflict its bite, it generally throws itself, in the first place, into a coil, which is more or less close, and thus is enabled to raise the upper part of the body on a base formed of the lower extremity. The neck is then bent backwards abruptly, and the head fixed horizontally towards its victim. Then in an instant the head is violently directed forwards, and the fang, which is erected by means of a very small muscle, is implanted into the object of its anger. The remedy which is generally used is to rub the part affected with olive-oil while it is held over a chafing-dish of coals. There are many venomous snakes which are popularly, though wrongly, called vipers. One species is called the horned viper, (*Cerastes Hasselquistii*,) is found along the valley of the Nile and the warmer parts of Northern Africa; it is, in fact, the viper which is seen usually depicted on Egyptian obelisks and monuments. By some critics, the horned viper is supposed to be the same as the asp with which Cleopatra is said to have terminated her existence; but the supposition is open to some objections. (*See* CERASTES.) The short-tailed viper, or puff-adder, of the Cape of Good Hope, (*Clotho Atropos*,) is another variety, and is the most deadly of the snakes of South Africa. It is of a brown colour, and is larger than the former. The natives are said to render its bite innocuous by chewing certain roots, and washing the part bitten with a vegetable decoction. (*See* PUFF-ADDER.) The death-adder of Australia (*Acanthophis antarctica*) is the last of the family, and is the most dangerous and fatal of smaller reptiles. Persons are asserted to have died of a bite from the death-adder in less than a quarter of an hour afterwards, so sudden have been the effects of the poison. In appearance and general characteristics, this variety is nearest to the typical species. (For WATER-VIPER, *see* CENCHRIS.)

VISON. (*See* MINK.)

VLACKE-VARK, *flacker-fark*, or EMGALLA, one of the South African hogs, (*Phacochœrus æthiopicus*.) This is a large, heavy, ungainly-looking animal, with long tusks and a portentously ugly head. One of the chief peculiarities of this animal is the enormous projection which flanks the face on either side, just below the eyes. So large are these excrescences, and so deeply sunken are the eyes, that the creature cannot look behind it in the usual manner of animals, and is therefore obliged to hold its head perpendicularly, and to cast a glance over its own back. As it always holds its tail perpendicularly when it runs, the general effect is very ludicrous. The long tusks that project from the mouth are well armed, and are extremely sharp, so that a blow from these formidable weapons is as effective as a sword-stroke by a skilful hand. Awkward as the vlacke-vark may seem, it is in reality marvellously quick and active, springing about with an energy which we in England seldom associate with the pig tribe. But a prize English boar, kept without exercise, and fed with unlimited quantities of the most nourishing food, is a very different animal from the wild boar, which, having passed all its life in freedom, can use its limbs with great activity, and gets no food except by its own exertions. The manner in which a wild boar dashes through underwood never fails to astonish the viewer. The boar cares nothing for the densest thicket, but plunges at it like a diver into the water; its wedge-shaped head pushes the boughs aside, so as to make room for the body to follow; the projecting tusks protect the eyes, and the animal vanishes as if by magic, leaving the spectator in silent astonishment. It is not only a fierce but a crafty animal. As long as it sees a chance of escape, it will endeavour to flee, and has thus most curious modes of evading a foe. Gordon Cumming mentions one instance where he chased a vlacke-vark for more than ten miles, and at last contrived to head him, and drive him towards the camp. This manœuvre is always practised by hunters, to save themselves the trouble of carrying the meat farther than necessary. The boar took the matter so easily that Cumming suspected a trick, and was just going to shoot him, when all at once he found himself among a quantity of ant-bear burrows, at one of which the boar suddenly charged stern foremost. The animal could not be shot, and would not leave his refuge, although smoking him out was attempted for some time.

VOLE, *vole*, a name for certain rodents, which are popularly, but wrongly, called rats and mice; they being, in fact, allied to the beavers, and not to the mice. The well-known water-vole, or water-rat, (*Arvicola amphibius*,) is a good example of the vole. It may at once be distinguished from the true rat by its short, blunt muzzle, and its small, rounded ears, which are almost hidden in the fur. It does no harm to fishes, being a vegetable feeder. The waterside rats that eat fish are merely barn rats, which have taken up their summer quarters by the river-bank. The campagnoles, or field mice, also belong to the same genus, and may be distinguished by the same characteristics.

VULPES. (*See* FOX.)

VULTURE, *vul'-tsher*, (Lat. *vultur*,) the type of the *Vulturidæ*, a family of rapacious birds belonging to the order *Accipitres* and sub-family *Diurni*. The characteristics of the family are as follows:—Bill rather elongated, occasionally slender, but generally strong, and always straight in its basal portion, but rather suddenly hooked at the tip; the eyes placed on the sides of the head, but not, as in the *Falconidæ*, shaded by the bony ridge of the beak; wings long and pointed; tarsi short, stout, and curved, with reticulated scales; and the toes of moderate size,—the hinder one short and rather elevated, and all armed with strong blunt claws. The habits of the vulture tribe differ from those of the eagle in this respect, that the eagle, unless violently pressed by hunger, will not stoop to carrion, loving to kill and catch for itself; whilst the vulture is indiscriminately voracious, though not so frequently attacking living animals, as its wants can readily be supplied by the putrid bodies of those that are dead. It appears to delight in loathsomeness, and is sometimes found uprooting new graves in order to satisfy its longing appetite with their contents. In these habits, too, the wisdom and the goodness of the Deity are strikingly observed, by His creating a bird of so filthy and disgusting habits in those countries where, from the heat of the sun, dead bodies almost immediately putrefy, and but for these birds might frequently be the source of great pestilential diseases. The vultures are consequently the scavengers of hot climates, and as such are often venerated and treated with respect, rather than abhorred and despised, as their habits might lead an unthinking observer to suppose. The species of the vulture are not very numerous, and their distribution seems to be wisely regulated according to their usefulness. They are sparingly scattered over Europe, are more numerous in Egypt, and abound in tropical America, on an increasing scale, in proportion to their sphere of action. There are two principal groups or families,—the *Vulturidæ*, or true vultures, which are characterised by their possession of strong bills, and their nostrils being placed perpendicularly; and the *Sarcoramphidæ*, or condors, characterised by their having slender, lengthened bills, and longitudinal exposed nostrils. As the latter family has been fully explained under the heading Condor, our present article only refers to the *Vulturidæ*, or family of the vultures. Of the European species, the griffin vulture (*Vultur* (*Gyps*) *fulvus*) may be taken as the type. This bird is found inhabiting the provinces of Silesia, Dalmatia, Spain, the Tyrol, the Alps, the Pyrenees, Turkey, the Grecian Archipelago, and also the north of Africa and Persia. It is about four feet in length. Its head and neck are thickly covered with white down, except at the crop, where the skin is naked and tinged with blue. Round the lower part of the neck there is a sort of ruff, made of pure white slender feathers, and the rest of the plumage is generally a grayish or yellowish brown, with the exception of the feathers of the inside of the upper parts of the legs, which are, like the ruff, pure white. The food of the griffin vulture consists almost entirely of carrion; for although it has been known to prey on living animals, yet its blunt and curved talons unfit it for attacking any but such as are incapable of making any resistance to it. It always builds its nest upon the highest and most inaccessible rocks, or upon the tops of lofty trees in mountainous regions. The sociable vulture (*Otogyps auricularis*) is one of the largest species, measuring sometimes ten feet in the extent of its wings. This variety is a native of South Africa, and is appropriately named from the fact of the species always congregating in large numbers together, when not even in pursuit of prey. The flight of this bird is said to be grand and powerful in the extreme, as it soars so high in the air as to have its body lost to sight, which is somewhat remarkable, considering its extreme size and the weight of its body. Although it remains at so high an elevation, however, no sooner does an animal fall dead to the ground on the earth below, than the keen sight of the vulture instantly enables it to detect its prey, and it at once flies direct to it. The king vulture, (*Sarcorhampus papa*,) of the sub-family of the Condors, may be mentioned as the most elegant specimen of the whole family of the *Vulturidæ*. It is an inhabitant of South America, and by its remarkable habits has greatly attracted the notice of travellers.

W.

Wagtail, *wag'-tale*, a popular name for some pretty and familiar birds, (*Motacella*,) of which there are several British species. They are all lovers of water, and are remarkable for their habit of wagging their long tails up and down when they alight, or when they stop after running along.

Wah. (*See* Panda.)

Walking-fish, a popular name for one or two fish, which have the power of traversing land by means of their long pectoral fins. The best-known species is the walking-fish of the Indian seas, (*Antennarius hispidus*.) It belongs to the Acanthopterygia, and has a very short and deep body, and the pectoral fins set on a greatly-elongated wrist.

Walking-stick Insect, (*Bacteria*,) a remarkable insect belonging to the Orthoptera, and having a long cylindrical body and long legs, which can be folded up against the body, so that the creature exactly resembles a rough stick.

Walrus, *wol'-rus*, (Ger. *Wall*, a whale; *Ross*, a horse,) a species of the *Phocidæ*, or Seals, a family of marine animals, belonging to the class *Mammalia*, ord. *Feræ*, (*Rosmarus marinus*.) It is sometimes called the Morse. The characteristics of the walrus are as follows:—Skull large and heavy, and the facial portion much more elongated than in the true seals; nose broad and obtuse; teeth, six incisors in both jaws of the very young animals, but in the adults all these fall out with the exception of two, which remain in the upper jaw; the upper canines extremely long, forming a pair of pointed tusks, which pass downwards between the small canines of the lower jaw, and project a considerable distance below the chin; the molars variable in number, as they fall out as the age of the animal increases; and the body of the animal, in conclusion, is bulky; but in its general form, and in the position of its legs, it resembles the seals. The walrus is said sometimes to attain the length of twenty feet, and even upwards, and often weighs as many hundredweights. Its skin, it may be likewise mentioned, is covered with a thick crop of short brown hair. It is a native of the Northern Ocean and the North Pacific; and from the observations of voyagers appears generally to feed on sea-weed. It is most abundant about the Sea of Kamtschatka, and is hunted chiefly for its oil and tusks, the latter of which measure from fifteen to thirty inches in length, and weigh from five to ten pounds, and are composed of a beautiful white, hard species of ivory. The oil is but scanty, but is far superior to that of the whale in excellence. Its flesh is coarse and unpalatable to Europeans, but is eaten by the Esquimaux, and its skin is highly serviceable in the manufacture of traces, breeching-straps, and ropes, &c. The tusks of the walrus, it may be mentioned, are said to be principally used by him for the purpose of assisting him to climb on the icefloats, even more so than as defensive or offensive weapons, as he is a great harmless animal. They can, however, be used as weapons, and are sometimes wielded with terrible effect. A full-grown walrus is three times as large as an ox, and its strength is proportionate to its size. It will always rather run than fight, but if brought to bay, especially in the water, it uses its tusks with great effect. Even the polar bear cannot overcome a walrus; and in several specimens of bears which have been shot, great wounds on their backs testified to the prowess of the walrus, and the efficiency of its weapons.

Wanderoo, *wan'-der-oo*, a very curious monkey belonging to the Macaques, (*Silenus veter*,) inhabiting India. It is black in colour, with the exception of a huge mass of hair that falls from the head over the shoulders, just like the wigs that were fashionable in the time of Charles II. The upper part of this wig is black, but along the sides it assumes a gray hue that gives the animal a very venerable aspect. It bears the climate of England very well.

Wapiti, *wop-i-tee'*, a magnificent deer of North America, (*Cervus Canadensis*,) which somewhat resembles the red deer of our own country, but is much larger. By the Canadians it is wrongly called the elk. It lives in large herds, sometimes three or four hundred in number, each herd being under the command of a single leader. In the winter, the herd assembles in one place, on the northern side of a mountain, and tramples a great number of paths through the mazes, always keeping the roads open by continually traversing them. These assembling-places are called yards, and as the wapiti will not leave them, the hunter can kill almost every member of the herd. The wapiti is an admirable swimmer, and is mostly to be found near lakes. The horns and fur are very valuable.

WASP, *wosp*, (Sax. *wæsp*,) the type of the *Vespidæ*, a fam. of aculeated hymenopterous insects. Its chief character is taken from its wings, which are folded throughout their entire length when it is at rest, forming a pair of long narrow organs running along the back. The tongue is also very long; the maxillæ long, and in texture coriaceous, (*i.e.*, having the consistence of leather;) and the eyes notched. The common wasp, (*Vespa vulgaris*,) which we have taken as the type of the family, is otherwise known by the appellation of the *social wasp*, on account of its generally living in extensive communities, inhabiting a nest formed in the ground. These nests are formed of a paper-like material, prepared by the insects from vegetable substances that they find, masticate until it has acquired a pulpy consistence, and then apply towards the formation of the structure of their habitation. The outside is composed of layers of a rather coarse species of paper, and the interior is subdivided into a series of transverse combs, composed of hexagonal cells, with the mouths placed in a downward direction. Little pillars of a similar substance unite the combs, and in the cells the eggs are laid, and the larvæ constantly fed by the working wasps in a similar manner to the bees, only that instead of laying up a store of honey, like them, they feed them from day to day. Each nest is generally occupied by about a hundred females, and these are the only members of the community that survive the winter, the others dying off at the first frost. These, being previously impregnated by the males, lie in some protected spot during the duration of winter, and, as soon as the spring sets in, they set to work to build a new habitation for the hatching of their eggs. As soon as these are brought into life, the community is re-established, and their labours divided as before by the workers, the males and females, whose province it is to repopulate the hive, never being found to engage in any work whatever with regard to the establishment. The larvæ are little fleshy grubs, destitute of feet, but they are supplied with lateral tubercles. These are fed daily, as before observed, by the workers, with food, which is previously half-digested in their stomachs. Another English variety is the tree wasp, (*Vespa britannica*,) which builds its nest of a thin paper-like substance, and suspends it from the branches of trees.

WATCH, DEATH. (*See* DEATH-WATCH.)

WATERING-POT SHELL. (*See* ASPERGILLUM.)

WATER-MOLE. (*See* DUCKBILL.)

WAXWING, *wax'-wing*, a handsome bird, belonging to the chatterers, and sometimes found in England, (*Ampelis garrula*.) It derives its name from its having appendages to the secondary and tertiary quills of the wings, which look exactly like spots of red sealing wax. The Cedar-Bird of America is closely allied to it.

WEASEL, *we'-zel*, (Sax. *wesle*,) the type of the *Mustelidæ*, a fam. of carnivorous animals of the ord. *Feræ*. They are distinguished by their long and slender bodies, by which they are enabled to worm themselves through the smallest apertures in search of their prey. They can run with considerable swiftness, notwithstanding the great length of their bodies and comparative shortness of their legs; but they more frequently take their prey by surprise, and are of a very sanguinary disposition, having a wonderful thirst for blood. Hence they make dreadful havoc amongst poultry, killing scores in a night sometimes; not for the purpose of eating the flesh, but merely piercing the throats of their victims and drinking their blood. They are equal enemies to rats, mice, and other vermin, however; so that there are never any of these found in the locality where a weasel frequents. The weasel usually found in this country, (*Mustela vulgaris*,) measures about seven inches from the tip of the nose to the insertion of the tail, which is about two inches long. Its height is about three inches. The colour is a pale reddish-brown on the back and sides, but a beautiful white beneath, and the tail is bushy. The eyes are small and black, the ears round and short, and the nose furnished with long whiskers like a cat. It moves along by unequal leaps, and is capable of springing several feet from the ground at a bound, and can easily climb up a wall. It is of a bold and ferocious disposition, being used to attack animals of apparently double its strength. It can go also a long time without food, as its means of subsistence are precarious, and is known sometimes to resort to a vegetable diet, when an animal one cannot be procured by it. Like other varieties of its family, as the polecat and ermine, it carries a fœtid odour about with it, arising from some glands secreted below the abdomen. The weasel generally inhabits the temperate parts of Europe.

WEAVER-BIRDS, *wee'-ver*, a group of birds belonging to the finches, and resident in the hotter parts of the world, (*Ploceidæ*.) They derive their popular name from their beautiful nests, which are woven from long grasses, and assume most curious shapes, such as flasks, retorts, &c. They are hung from the ends of twigs, mostly over water, so that, if a monkey or snake endeavours to rob the nest, the thief is ducked in the stream. One species, the Social Weaver-Bird, lives in great companies, and makes a joint nest, so large that six or seven men could be hidden under its roof.

WEEPER MONKEY. (*See* SAI.)

WEEVILS, *wee'-vil*, a vast family of beetles, called Curculionidæ, which have very long snouts, and the jaws at the end of the snout. They are very destructive in the larval state, destroying much of our fruit. The nut maggot is a weevil, and so are the little creatures that destroy our peas in the pod. Their exterior is covered with scales, which have a metallic brilliancy under the microscope. The well-known diamond beetle belongs to this family.

WHALE, *wail*, (*Balæna*,) a gen. of animals belonging to the class *Mammalia*, and ord.

Cetacea. The whale is a marine animal, it is also viviparous, and suckles its young, like other mammals. It also respires by means of lungs, and has distinctly separate blowholes; it has warm blood, and one species, the true *Balœna*, has no teeth, but instead large plates of baleen or whalebone attached to the upper jaw. The respiratory apparatus of the whale is peculiar in the extreme; the larynx is produced into a conical form, and when the creature is breathing, projects into the cavity of the posterior nares, where it is met and embraced by the muscles of the palate, and thus a free passage is opened through the nostrils from the lungs direct to the external air, although at the same time the whole head and mouth may be under water. In order to get rid of the water which is taken into the mouth, the whale performs the act of deglutition, but at the same time closes the pharynx to prevent the passage of the water beyond the necessary point. By these means it is forced up the nasal passages, and by a sudden contraction of the muscles about these parts, is finally expelled in a jet of water, which rises to some height. The head of the whale is disproportionately large in comparison with the size of the body, generally being one-third, and often one-half, the size of the latter. The skull is generally unsymmetrical. The arrangement of the baleen or whalebone in the most of the Greenland whales, *Balœna mysticetus*, is very peculiar. A strong bony keel runs along the centre of the palate, on each side of which is a very broad depression, along which the plates of baleen are attached. These are long and flat, and are attached to the palate by their bases, hanging down into the mouth. From these being placed transversely, their sides are parallel, and at a very small distance from each other, the base of each, as well as the outer edge, being composed of solid whalebone, while the inner edge terminates in a filament of fibres which fill up the whole interior of the mouth like a curtain across it. The object of this is entirely owing to the arrangement of the stomach of the whale, which is so small in comparison with his great bulk that his food consists only of the smallest of the swimming mollusca. To procure his prey he is thus obliged to engulf a whole shoal in his mouth at once, where they become entangled in the fibres of the balæna. The water is then strained off, and poured through the blowholes, while the animal can pass his diminutive prey into the œsophagus as he requires. It may be thus seen that the balæna serves the purpose of a sort of sieve, and separates the food which the whale feeds on from the water which he cannot but take in at the same time that he seizes his prey. The baleen plates are generally from eight to ten feet long, and number about six hundred. The substance of which they are composed is a well-known and valuable article of commerce, termed whalebone, and the produce from a single whale often sells for from between £200 and £300. The Greenland whale is one of the best known species, and is a native of the northern seas. It is about sixty feet in length and forty in circumference, and its average weight has been estimated to be about 500,000 pounds. The back and sides are covered with fat of an exceedingly unctuous character, termed "blubber;" and so oily is

this substance, that a hundred barrels of blubber will produce nearly ninety-six barrels of oil; so that the refuse and waste is but very slight. The whole body of a whale of this species, of the full size, will yield from fifty to sixty puncheons of oil, each puncheon containing seventy-four gallons; the whole value of such a fish is therefore about a thousand pounds sterling. The young ones produce about fifty barrels of oil when they are only a year old; but at that time they are particularly fat. The female produces her young alive, after a gestation of about nine or ten months, and is even more attached than the generality of animals to her young, many instances of her being known to sacrifice her life rather than leave them. The Greenland whale is found generally in the Arctic seas, but principally in Baffin's Bay, where the whale-fishery is carried on. The southern whale, (*Balœna australis*,) is another variety found in the southern seas, principally about Australia and New Zealand. The head of this variety is smaller in comparison than that of the Greenland whale, but its size altogether is about the same. The *Balœnoptera*, or fin-backed whales, are another family, which differ from the preceding by possessing a soft dorsal fin. These are even larger than the Greenland whale, but are not so valuable, as their yield of oil is much less, and it is not by any means worth so much. The *Cachalot*, or *Sperm whale*, is described elsewhere. (*See* SPERM WHALE.) The *Narwhal* may be lastly mentioned as one of the most curious members of the *Delphinidæ*, or third family of the *Cetaceans*. (*See* CETACEA.) The Sea Unicorn or Narwhal, (*Monodon monocerus*,) has no teeth in the lower jaw, but has the upper jaw armed with generally one, and sometimes two, projecting spinal teeth. It is a native of the North Sea, and often reaches the length of from twenty to thirty feet. The *narwhal* feeds generally on fish of the skate and turbot kind, which it captures by means of its tusk. This peculiar weapon is from six to ten feet long, and is of very fine, hard, pure ivory, which renders it valuable to capture. It is said sometimes that this peculiar fish has driven its tusk through the bottom of a ship. The blubber of the narwhal is valuable, but not much in quantity, and yields a very fine oil.—The GRAMPUS, (*Phocœna orca*,) is another example of the *Delphinidæ*, which may be mentioned under the present heading. It is a native of the North seas, but is often found in the Atlantic, and is by no means an unfrequent visitor to the British coasts and the shores of France. It is generally classed amongst the porpoises. Its characteristics will be found given under the article PORPOISE.

WHALLABEE, *wo'l-la-bee*, a small kangaroo of New South Wales, (*Halmaturus ualabatus*.) It can be distinguished from the true kangaroo by the bald state of the muzzle. It is grayish brown in colour, with a slight wash of red.

WHEATEAR, *weet-eer*, a pretty and familiar bird of our own country, (*Saxicola œnanthe*.) Its flesh is so delicate that it is sometimes called the British ortolan, and it is killed in vast numbers for the table, being mostly taken in ingenious and simple snares made of a horsehair noose and a piece of twig.

WHELK, *welk*, (*Buccinium undatum*.)—The common whelk is a gastropodous mollusc belonging to the fam. *Buccinidæ*, which contains upwards of a hundred fossil, and as many as twenty existing species. It is commonly found along the British coasts, and in the Atlantic, even lying as far north as Greenland. It is dredged for as an article of food, and is taken usually in deep water, being found as low as a hundred fathoms from the surface. It is said that the ancients extracted the celebrated "Tyrian dye" from some of the members of the whelk family.

Whidah Birds, or **Widow Birds**, a name given to some beautiful little birds brought from Western Africa, (*Vidua*,) which are remarkable for the great length and beauty of the tail. They are great favourites as cage-birds, and it is curious to see how sensitive they are about their personal appearance. When in full plumage, they are bold, and brisk, and lively; but when they lose their tail in the moulting season, they skulk about the cage, and seem to be quite ashamed of themselves. They are closely allied to the weaver-bird, and build nests which are very beautiful, and complicated in structure.

Whimbrel, *wim-brel*, a well-known British bird, (*Numenius phœopus*,) closely allied to the curlew. It is smaller than that bird, and the bill is not so long nor so much curved.

Whip-poor-Will, *wip-poor-will*, (*Caprimulgus vociferus*,) a well-known species of the Goatsucker or Nightjar, common in North America. It is about nine inches in length, and eighteen in the extent of its wings, and its plumage and characteristics strongly resemble the European goatsucker. The name of this bird is derived from the peculiar cry which it emits, composed as it is of three distinct notes, sounding exactly like the words *whip-poor-will*, with the emphasis laid strongly on the first and last words. The noise these birds make at night is perfectly astounding to one previously unacquainted with them; and the Indians assert that they are the spirits of departed warriors, and that their perching on any house is a token of the approaching death of one of its inhabitants. (*See* Goatsucker.)

Whirlwig Beetle, *wurl-wig*, a little aquatic beetle, (*Gyrinus natator*,) which is very plentiful in fresh water, and may be seen in little companies circling about the surface with astonishing agility. It is remarkable for the eyes, which look as if they were four in number, but are, in fact, simply divided by a narrow band.

White Ants. (*See* Ant, White.)

Whitebait, *wite'-bait*, (*Clupea alba*,) a well-known fish of the ord. *Malacopterygii*, and a member of the *Clupeidæ*, or Herring family. Formerly the whitebait was considered to be only the young of the shads and sprats, but later naturalists have determined it to be of a distinct genus of its own. It is the young whitebait which are so largely taken in the Thames, and used in the celebrated whitebait dinners particular to Greenwich and Blackwall. But the larger and adult fish, which seldom exceed six inches in length, are taken in large quantities off the Kent and Essex shores during the winter. The whitebait fishery is also pursued in the Firth of Forth.

Whiting, *wi'-ting*, (*Merlangus vulgaris*,) one of the smaller varieties of the Codfish fam., of whose peculiarities it strongly partakes. (*See* Gadidæ.) The whiting rarely reaches a pound and a half in weight, but, as its flesh is very delicate, it is much esteemed as an article of food, and in consequence, is in much request in the market. It abounds on all the coasts of Britain, and generally approaches the shore in large numbers during the months of January and February for the purpose of depositing its spawn. It is generally caught by hook and line, baited with common molluscs and pieces of fish. Long lines, which are left out all night, are used, as well as hand-lines, by the fishermen. And whiting, cod, hake, &c., are caught indiscriminately.

Widow Bird. (*See* Whidah Bird.)

Wigeon, *widg-on*, a pretty little British duck, (*Mareca penelope*,) that arrives in vast flocks, and settles in the fen counties, where great numbers are killed and sent to market. Their plumage is very handsome, being white, chocolate, black, green, gray, and brown.

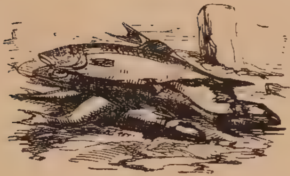
Wild Boar. (*See* Hog Family.)

Wireworm, *wire-wurm*, a well-known and destructive larvæ, which is found in wheat and potatoes busily devouring the root. It is the larvæ of a beetle, popularly called the Skipjack. (*See* Elateridæ.)

Wish-ton-wish. (*See* Prairie Dog.)

Wolf, *wulf*, (Sax. *wulf*,) (*Canis Lupus*,) a variety of the *Canina* or Dog fam., of whose characteristics and general structure it strongly partakes. (*See* Canina.) At one time the common wolf was a native of this country, and there was a period when its ravages were so great that the month of January was called by the Saxons the *wolf month*, because numbers of people, as well as cattle, sheep, and other animals, were devoured by flocks of them at that time of the year. It is found at the present time in the Northern portions of Europe and Asia, residing principally in mountainous regions, whence it descends in the pursuit of prey. In structure the wolf is about the size of a large dog, but it is leaner and more gaunt in appearance, its height being from two feet and a half to three feet, while its length varies between three and four feet. The colour of its coat is a mixture of black, brown, and gray, the hair being rough and hard, and mixed at the base with a sort of under-coat of ash-coloured fur. Its eyes have a most peculiar obliquity, which gives it a very fierce appearance, being directed upwards in a line with the nose, and the colour of the eyeballs being a fiery green, the ferocity inherent in the animal appears increased. The breath of the wolf is very offensive, and his flesh is said to be rejected by all other carnivorous animals, with the exception of those of his own species. It is, however, palatable enough when cooked, and the ribs are considered quite a delicacy. The female goes fourteen weeks with young, and produces five or six cubs at a litter, which she tends and trains with the greatest assiduity for the space of some twelve months, after which she leaves them to shift for themselves. In disposition the wolf is a cruel, cowardly animal, generally attacking such as are unable to resist it; but when pressed by hunger, it will even attack man. The wolves generally hunt and pursue their prey in packs; and in hilly countries, where precipices abound, they often destroy far swifter animals than themselves, by encompassing them in a semicircle, and driving them over some great declivity, where they are dashed to pieces. The wolves then

ARCTIC WHALE.



WHITEBAIT.

WHITING.

INDIAN WOLF

descend by some path, and feast on their victims. The most common variety of the wolf is that found in North America, and termed the black wolf, (*Canis nubilus* or *Canis acidulatus*,) which is very common throughout the northern and western regions of that continent. The prairie wolf, or prairie dog, (*Canis latrans*,) is another variety, which has been already described. (*See* Prairie Dog.) The Indian wolf, or landgah, is a native of Nepaul, but is not so numerous. The pouched wolf, or Tasmanian wolf, (*Paracyon cynocephalus*,) is another genus belonging to the marsupial classes of animals, and belonging to the Dasyures. It has a wonderfully wolf-like aspect, but the opossum-like tail at once points out its true position. It is a handsome animal, its colour being yellowish-brown, and the whole of the back being crossed by stripes, like that of the zebra. In former days it used to commit great depredations on the flocks, but at the present time it has been driven from the neighbourhood of civilisation, and is but little feared.

Woodcock, *wud-kok*, a well-known British bird, allied to the snipes, (*Scolopax rusticola*.) It is one of the winter visitors; and as it is not a very easy bird to shoot, and the flesh is very delicate, it is much valued by sportsmen.

Woodlark. (*See* Larks.)

Woodpeckers, *wud-pek-urs*, a large group of birds, several species of which inhabit England, (*Picidæ*.) They belong to the scansorial tribe, and are well known for their habit of running up trees, and pecking holes in them. This is for the purpose of feeding on the insects which live under the bark, and bore into decaying trees. They make their nests in tunnels which they bore into trees, and in all cases the tree is diseased upon the spot where the burrow is made, so that the woodpecker is rather beneficial than hurtful to the tree. Perhaps the best example of this group is the great ivory-billed woodpecker of America (*Campephilus principalis*), which is well described both by Audubon and Wilson.

Woodpigeon. (*See* Pigeons.)

Woodshock, *wud-shok*, one of the martens inhabiting North America, (*Martes Canadensis*,) sometimes called the pekan. Its fur is rather valuable, and when dyed, and otherwise manipulated, is fraudulently sold as that of the sable.

Wombat, *wŏm-bat*, a curious marsupial animal of Australia, (*Phascolomys ursinus*,) popularly called the badger. It is a short, heavy, thickset animal, which is an admirable burrower, and is not easily captured when it has gained its home. Its flesh is much valued, and the animal is therefore much persecuted. Several species of wombats are known.

Worm, Earth. (*See* Earth-worm.)

Worms, *wurmz*, (Sax. *wyrm*, a worm,) parasitical animals which infest the intestinal canal of man. They are of five different kinds,—the *Ascarides*, or small thread-worms, varying from an eighth of an inch to one and a half inch in length, and have usually their seat in the rectum, or last gut; the *Lumbrici*, or long round worms, from two or three, to ten or more inches in length, and usually occupy the small intestines, and sometimes the stomach; the *Trichurus*, or long, hair-tailed thread-worm, occupying the cœcum; and the *Tænia*, or tape-worm, of which there are two kinds, occupying the whole tract of the intestines, and sometimes thirty or forty feet in length. Worms appear most frequently in those of a relaxed habit with weak digestive organs. An excessive use of fruit and vegetables, or sugar, or any other highly nutritive substance, favours the generation of worms. From the highly-organised and sensitive parts which they occupy, worms give rise to great constitutional derangement, and produce a variety of symptoms, more particularly affecting the stomach and head. Among these are, variable appetite, fœtid breath, picking of the nose, hardness and fulness of the belly, sensation of heat and itching in the anus, preternaturally red tongue, or alternately clean, and covered with a white slimy mucus; grinding of the teeth during sleep, short, dry cough; frequent slimy stools, emaciation, slow fever, with an evening acerbation, irregular pulse, and sometimes convulsions or fainting fits. The treatment must be of a tonic and strengthening character, together with an avoidance of vegetable and saccharine food. For the removal of the smaller kinds of worms, purgatives of the submuriate of mercury, scammony, aloes, rhubarb, &c., are recommended. For the removal of the tape-worm, turpentine has been found to be the most useful remedy. It is best given alone, in a dose of half an ounce, on an empty stomach, followed after an interval of two hours, by an ounce of castor-oil, or a full dose of any brisk aperient.

Wreck-fish. (*See* Stone-basse.)

Wren, *rĕn*, a well known little British bird, that is easily recognised by its diminutive form, and its short and nearly perpendicular tail, (*Troglodytes vulgaris*.) Although so small a bird, its song is wonderfully powerful, resounding as if produced by a bird of three times its size. It loves hedgerows, and may be watched by any one who will take the trouble to stand perfectly still. In that case the wren will perch within a yard of the observer's face, and carol its merry song as if no human being were visible. The nest of the wren is made of leaves and other substances, and is domed, so that the tiny young obtain a perfectly warm shelter.

Wren, Golden Crested.—This little bird has no real title to the name of wren, but is so called on account of its diminutive size, (*Regulus cristatus*.) It is properly called the kinglet, and may be recognised by the golden-coloured crest upon its head. Its nest is beautifully made, and may be called a pensile nest, as it hung to a branch, under the shadow of leaves or fruit.

Wryneck, *ry-nek*, a little bird allied to the woodpecker, and very plentiful in England, (*Yunx torquilla*.) It derivesits name from its habit of writhing its head and neck like an angry snake. It feeds on insects, which it captures by means of its long tongue. Its note is curious, and may be exactly imitated by the little machine which is used to produce the voice of Mr Punch, and which is technically termed a "swatchel."

X

Xiphias. (*See* Sword-fish.)

XIPHOSURUS, *zif-ŏ-sēw-rus*, a gen. of lizard, belonging to the fam. anolidæ. It derives its name of xiphosurus, or sword-tail, from the structure of its long tail, which is edged with a toothed and somewhat sharp crest. In common with the rest of its family, it has a pouched throat, which it can puff out when irritated, and which it seems to fancy will have the effect of frightening its enemy. It is a very active lizard, and can run up a perpendicular wall with ease, and leap from one spot to another with much agility. Indeed, it possesses to the full the curious mixture of energy and indolence which characterise the reptiles, and although it will dart about so rapidly that the eye can scarcely follow its movements, it will also have periods of inactivity, and remain motionless for hours. It is usually called the crested anolis, and inhabits the hotter parts of America.

XYLOCOPA. (*See* CARPENTER BEE.)

Y

YACARE, or **JACARE**, *ya-kăh-rae*, a Brazilian alligator, (*Jacare sclerops*,) which is remarkable for its large fleshy eyelids. It is sometimes called the spectacled cayman. It may also be known by a ridge across the face.

YAK, *yak*, a remarkable animal of the ox tribe, living in Thibet, (*poephagus grannilus*.) The male of this animal has very long hair upon the flanks and tail, and the latter is extremely valued in the East, where it is fixed to a handle, and used as a fly-flapper. When complete, the instrument is called a chowrie. The yak lives on the highest mountains, and is astonishingly agile. There are two varieties of this animal, the noble yak, which furnishes the most expensive chowries, and the plough yak, which is smaller, and kept for work.

YAPOCK, *yah-pok*, a handsome opossum of Guiana, (*Cheironectes yapock*,) which is remarkable for its webbed feet and its swimming powers, which enable it to chase and catch fish in the rivers. It is a handsome animal, the colour being gray, upon which are drawn four cross bands of black, and a black stripe along the spine. These colours are brighter in the young than in the adult animal.

YARKE, BLACK. (*See* SAKI.)

YELLOW-HAMMER, or **YELLOW-AMMER**, a well-known bird of our island, belonging to the buntings, (*Emberiza citrinella*.) Like the wheatear, *q.v.*, this bird becomes very fat, and is excellent for the table. It is plentiful in most parts of England, and belongs to the same genus as the ortolan.

YELLOW SNAKE. (*See* CHILOBOTHRUS.)

YUNX. (*See* WRYNECK.)

Z

ZEBRA, *ze'-bră*, a peculiar variety of the gen. *Asinus*, which is found in South Africa. The eminent naturalist, Buffon, described the zebra as being the best-made and most beautifully clad of all the quadrupeds. To the figure and gracefulness of the horse it adds the elegance and swiftness of the stag, whilst its skin is as smooth as satin, and beautifully adorned with black and white bands, arranged with wonderful regularity and beauty. These bands are narrow, parallel, and exactly separated, and, unlike the case in the quagga, extend not only over the body, but over the head, ears, thighs, and legs. In the female, they are black and white, but in the male they are black and yellow; but always of a brilliant tint, so as to enable them to stand out, as it were, from the coat. The ground-coat is composed of fine hair, which adds to the general effect by giving it a satin or velvety appearance. The zebra is closely allied to the ass, having its tail furnished with long hairs only at its tip, and being destitute of a main like the horse. They also, according to Dr Gray, come more strongly under the genus *Asinus* by being deprived of horny warts inside the hind legs. There are three varieties of the family, one of which, the quagga, has already been noticed. Of the remaining two, the common or hill zebra, (*Asinus Zebra*,) is the handsomest, having the stripes on all parts of its body. It inhabits the rocky and mountainous districts of South Africa, and is rarely seen on level land. In disposition it is very wild and untameable, seeking inaccessible crags where to graze, and having sentinels posted on commanding eminences, so as to give warning of the approach of any suspicious object: and, no sooner is an alarm given than the herd sets off, galloping over the crags with a swiftness which sets pursuit at defiance. The remaining variety is termed Burchell's zebra, (*Asinus Burchelii*,) which, like the quagga, inhabits the plains which stretch across the table-land contiguous to the Cape. This is covered with brown and white stripes, the brown ones being seemingly double, having a grayish one within them, and the legs are white, unlike those of the mountain zebra. In swiftness and beauty of appearance all these varieties, however, closely agree, and all live in vast herds, and roam about the country together. It is said they go as far north as Abyssinia; but this has not been exactly proved, and is consequently open to doubt.—The remaining characteristics of the family will be found given under the general article EQUUS.

ZEBU, *ze'ebew*, name for the curious humped cattle which are found in India. The male of this variety is the sacred bull of the Hindoo, and many of the animals are allowed to wander about the towns and villages, where they are very annoying, because they are never opposed. They go into the market and eat anything that they fancy—they lie down in the narrow lanes, and will not permit one to pass—and they will sometimes give an impatient push with their horns if they fancy that they are neglected.

ZEUGLODON, *zoog'-lo-don*, (Gr. *zeugos*, yoke; *odous*, tooth,) a tertiary mammal of the whale kind, so named by Professor Owen, from the peculiar form of its molar teeth. Dr Harlan described the remains of a skeleton, between seventy and eighty feet in length, first discovered in the eocene strata of Arkansas and Alabama, and under the supposition that it belonged to an enormous reptile, called it Basilosaurus, (king of the lizards;) but the more correct investigations of Professor Owen having shown it to be a tertiary mammal of the whale kind, the term Zeuglodon was given to it.

ZOOLOGY. (*See* ANIMAL KINGDOM.)

ZOOPHYTES, *zo'-o-fites*, (Gr. *zoon*, an animal, and *phuton*, a flower,) a class of marine animals belonging to the division *Radiata*. These are divided into five classes, of which the first (*Polypi*) and second (*Discophora*) come more especially under the term *Zoophytes.* The peculiar faculty possessed by these animals is their power of emitting phosphorescence in the dark, especially when disturbed or irritated, and it is to this power that the apparent luminosity of the sea in warm climates is due. This phenomenon is described by Mr Dallas in the following manner:—"The whole surface of the ocean is suffused with a pale light, which acquires the greatest brilliancy when the water is in any way disturbed. The passing ship leaves a brilliant illumination in its wake; the waves, in their gentle heavings, break into sparks and flashes of light; the oars of rowing boats are seen dripping with living jewels when taken out of the water, and each stroke produces a sparkling streak. This general luminosity is due to innumerable minute animals, amongst which larger and more brilliant species may be seen swimming in splendour, some like balls of living fire, others like waving bands of flame. The majority of these creatures belong to this division, (the *Radiata,*) and principally to the class of *Discophora*, well known to most of us as *Medusæ*, or jelly-fishes." The phosphorescence observed in these animals is generally supposed to be occasioned by the slimy fluid with which their bodies are usually covered. (*See* POLYPE and MEDUSA.)

ZOPILOTE (*See* CATHARISTA.)

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